

Mitigation Measures & CAD Standard Guideline

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Section 1. Mitigation Measures

This document outlines the most current project site conditions and the appropriate regulatory measures to mitigate or design requirement for recycled water use projects.

For a complete overview of the Recycled Water Program and EMWD Recycled Water Landscape Guideline Toolbox (Toolbox), please read the Recycled Water Irrigation Guideline V1.2 document.

1. Potable and recycled water system separation

- a. Where mainlines cannot maintain a 4-foot separation, the recycled water irrigation mainline shall be sleeved.
- b. No parallel piping from another source of water shall be installed within the 4-foot zone.
- c. Where the recycled water mainline cannot cross under a potable water pipeline with a 1-foot clearance, a 20-foot sleeve centered at the crossing shall be used (at a 90-degree crossing).
- d. Where a 20-foot sleeve is not feasible, the recycled water mainline shall be Controlled Density Fill encased (minimum 12" encased).
- e. When recycled water pipe is encased or sleeved, the minimum separation cannot be less than 6" from the edge of the sleeve or encasement to the component of the differing water source.

2. Hose spigot/bib

- a. The recycled water irrigation system shall not have the ability to accommodate a hose connection.
- b. No hose bibs/spigots are permitted within the recycled water irrigation system.
- c. Potable water hose spigots/bibs installed within a recycled water use area shall be installed in an EMWD approved lockable enclosure or drinking fountain.

3. Streets, parking lots, patios, & hardscape

- a. A 2-foot offset from hardscape surfaces shall be maintained. In addition, the protection of potable water appurtenances shall be ensured. Recycled water irrigation systems shall eliminate overspray, pounding, and/or runoff onto parking lots, sidewalks, concrete surfaces, streets, etc. through the use of decomposed granite/gravel, bark/mulch, drip/bubbler, subterranean drip irrigation components, etc.
- b. Drip and/or bubbler emitters shall be used, especially in high traffic areas, to eliminate overspray, runoff, ponding, and public contact.
- c. Irrigation mainline and control valves shall be installed at the toe of a slope.

- d. Irrigation systems shall be designed with internal check valves within irrigation emitting device to eliminate low head drainage and uncontrolled discharge from broken emitting devices. Recycled water must remain within the intended use area.
- e. A 4-foot separation shall be maintained between irrigation equipment and adjacent properties using potable water to minimize potential cross connections.
- f. A separation shall be maintained between adjacent properties and irrigation system(s) through the use of block walls, fencing, mow curbs, etc. Fencing and wall structures must be permanent and not have the ability of being easily disassembled (split rail/vinyl fencing materials).

4. Food preparation area (picnic benches, barbeques, drinking fountain, etc.)

- a. Irrigation components adjacent to sensitive areas shall be designed with low trajectory, memory arc emitting devices, to eliminate recycled water contact.
- b. Drip and/or bubblers shall be used to eliminate any misting, overspray, runoff, and/or public contact.
- c. The use of hardscape (decomposed granite, concrete, etc.) is acceptable to maintain separation.
- d. Internal check valves within irrigation emitting devices are required to eliminate low head drainage and uncontrolled discharge from broken heads.
- e. No quick couplers shall be installed within 50 feet of sensitive areas.
- f. Drinking fountains may have external hose bibs/spigots. Hose bibs/spigots shall have a keyed spigot.

5. Playground equipment/area, pool, decorative fountains, & splash pad

- a. Irrigation components adjacent to sensitive areas shall be designed with low trajectory, memory arc emitting devices, to eliminate recycled water contact.
- b. Drip and/or bubblers shall be used to eliminate any misting, overspray, runoff, and/or public contact.
- c. No quick couplers shall be installed within 50 feet of sensitive areas.
- d. The potable water make up supply pipeline shall have backflow protection installed.
- e. All adjacent hardscape shall drain away from sensitive areas.
- f. Addition exhibits may be required as well as DDW and/or jurisdictional agency submittal(s) for review and approval.
- g. Landscape irrigation within the pool enclosure must be designed with a dedicated potable water service connection.

6. Medical facilities

- a. Maintain a minimum 50-foot separation from any irrigation quick coupler to a potable water source, building entry, and/or outdoor rest area.
- b. An irrigation system shall be designed for the use of drip and/or bubblers to eliminate any overspray, runoff, misting, and public contact.
- c. Medical facilities require a DDW and/or jurisdictional agency submittal for review and approval.

7. Artificial turf

- a. Recycled water is not approved for use on artificial turf.
- b. Artificial turf shall be designed with a dedicated potable water service connection for cooling and/or washing.

8. School site

- a. A 2-foot offset from hardscape surfaces shall be maintained. In addition, the protection of potable water appurtenances shall be ensured. Recycled water irrigation systems shall eliminate overspray, pounding, and/or runoff onto parking lots, sidewalks, concrete surfaces, streets, etc. through the use of decomposed granite/gravel, bark/mulch, drip/bubbler, subterranean drip irrigation components, etc.
- b. Drip and/or bubbler emitters shall be used, especially in high traffic areas, to eliminate overspray, runoff, ponding, and public contact.
- c. Internal check valves within irrigation emitting devices are required. In addition, low trajectory, memory arc emitting devices shall be used to help eliminate low head drainage, overspray, and uncontrolled discharge.
- d. Parking lots or narrow strips of irrigated areas shall use drip and/or bubbler irrigation equipment.
- e. No quick couplers shall be installed within 50 feet of any food preparation area (picnic benches, drinking fountain, potable water source, building entry, outdoor rest areas, pools, etc.).
- f. A separation shall be maintained between adjacent properties and irrigation system(s) through the use of block walls, fencing, mow curbs, etc. Fencing and wall structures must be permanent and not have the ability of being easily disassembled (split rail/vinyl fencing materials).
- g. A DDW and/or jurisdictional agency submittal is required for review and approval.

9. Automatic strainer flushing sump

- a. The sump shall be designed to accommodate two and one half times (2-1/2) the volume of water that would be flushed from the strainer/filter in a single flush cycle. Maximum continuous flow of ___ gpm for ___ minutes discharged at ___ psi equals ___ gallons. ___ Gallons x 2.5 equals ___ total sump volume in gallons.

10. Controller and Point of Connection (POC) Sequence

- a. The controller must be capable of turning off the irrigation system during any adverse weather event or irrigation component failure. The irrigation controller must operate with a real-time Evapotranspiration based monitoring system that includes all sensor devices.
- b. The master control valve shall be normally closed and shall be installed at the point of connection.
- c. The recycled water meter and POC sequence/recycled water irrigation equipment (quick couplers, strainer, pump, master valve, flow sensor, sump, & injection pump) shall be located directly adjacent to the parcel/property it will serve. **No remote services will be permitted.**
- d. Irrigation systems that are temporarily supplied through a potable water service shall have a RP backflow device and the POC sequence shall be designed to accommodate the future recycled water POC equipment (pump, strainer, etc.). The POC system design shall incorporate the future recycled water source pressure. The potable water RP backflow device shall be removed during the recycled water irrigation system conversion to recycled water.
- e. Irrigation systems served temporarily with potable water are subject to applicable Financial Participation Fees (FPC) that are to be paid during the Application For Service (AFS) process.

11. Project phasing and multiple parcel conditions

- a. POC locations and stubouts for future phases shall be designed to accommodate the future phasing demands without orphaning any phased irrigated areas and/or systems.
- b. Recycled water shall not be served to a second phase and/or separate parcel(s) without EMWD approval.
- c. The civil engineer and landscape architect shall consider the following as part of the project site design:
 - i. Separation to fire and potable water systems
 - ii. Potable construction water source
 - iii. Interim and ultimate site conditions (phasing)

- iv. Interim and ultimate water source pressures
 - v. Water window restrictions (peak system demands)
 - vi. Equipment (strainer/filtration, pump, boxes, etc.)
- d. Temporarily potable water supplied systems shall be evaluated to account for the additional demand on the potable water facilities.
 - e. Temporary potable water sourced systems shall be subject to the potable water FPC fees for each meter/point of connection.
 - f. Regardless of the source of supply, all recycled water testing is required. In addition, initial and ongoing recycled water use site compliance inspections shall be performed.

12. Slopes

- a. To eliminate overspray, ponding, and/or runoff, a 2-foot offset shall be maintained between recycled water irrigation components and hardscape surfaces. The 2-foot offset can be achieved by the use of decomposed granite/gravel, bark/mulch, drip/bubbler, subterranean drip irrigation components.
- b. Drip and/or bubbler emitters shall be used, especially in high traffic areas, to eliminate overspray, runoff, ponding, and public contact.
- c. Irrigation mainlines and control valves shall be installed at the toe of slopes, except when installed on basins. Basins shall have mainlines and valves installed at the top of the slope.
- d. To eliminate low head drainage and uncontrolled discharge from broken heads, internal check valves within irrigation emitting devices shall be used.
- e. To eliminate potential cross connections of adjacent properties, a 4-foot separation shall be maintained between recycled water irrigation equipment and potable water irrigation equipment.
- f. A separation shall be maintained between adjacent properties and irrigation system(s) through the use of block walls, fencing, mow curbs, etc. Fencing and wall structures must be permanent and not have the ability of being easily disassembled (split rail/vinyl fencing materials).

13. Storm channel, blue line, water impoundment, basins, wells, & swales

- a. No irrigation components shall be installed within 24-inches of a basin bottom. If recycled water sprinklers are designed to be installed below the high-level water line of the basin, an approved backflow device must be installed at the point of connection.
- b. Basins shall have irrigation mainlines, quick couplers, and valves installed at the top of the slope. If the irrigation system has components installed below the high water line of a basin, a backflow device and/or vacuum breaker may be required. This will be determined during the review process.

- c. Recycled water shall not leave the designated use area. This shall be accomplished by an irrigation design and selection of components as accepted by EMWD, which ensures that the irrigation system operation does not occur while storm water exists within the basin.
- d. The use of moisture sensors at the toe of the slope may be required within a basin/swale to stop the irrigation cycles during times of water retention.
- e. To eliminate low head drainage and uncontrolled discharge from broken heads, internal check valves within irrigation emitting devices shall be used.
- f. The level of separation for regulatory restrictive use areas will be determined by EMWD and/or the jurisdictional agency during the review process.
 - i. channels
 - ii. drinking/water impoundment
 - iii. blue line/seasonal streams/creeks
 - iv. wells
 - v. pools/water features/fountains
 - vi. basins/swales

Additional exhibits may be required as well as DDW and/or jurisdictional agency submittal(s) for review and approval.

14. Potable water irrigation and functional turf

- a. All projects using potable water for irrigation will be required to submit the potable water irrigation plans, planting plans, and irrigation system water use demands for review by EMWD's Conservation Department.
- b. Functional turf is defined as a turf area that serves as a surface for such purposes as playing a sport or gathering for group activities. Projects that include turf areas for aesthetic purposes will not be approved.

Section 2. Irrigation Water Demand and Budget Calculations

The following requirements are intended to assist in determining project demand and infrastructure requirements throughout the phases of a development.

Recycled Water Use Plan (RWUP)

The RWUP is used for determining the backbone infrastructure for a project when the specific land use and associated landscape systems may not be known or may change. No service connections shall be shown on the RWUP. All parcels and/or tracts within the development shall be categorized as one of the following:

- Park or School – dedicated areas that will include functional turf
- Common Landscape – dedicated landscape areas such as streetscape, slopes, or basins that will not include functional turf
- Unknown – areas where the land use or landscape has not been determined

Peak GPM demand for each parcel or tract shall be determined as shown in Figure 1. The associated GPMs shall be used as demand nodes in a hydraulic analysis for determining backbone pipeline sizing as per the Recycled Water Planning Criteria. Backbone pipeline alignment shall be established to provide recycled water service to each parcel and/or tract within the study area and run the full length of each parcel and/or tract. The minimum pipeline size shall be 8-inch and a stub-out shall be provided at each entry to all parcels and/or tracts with an end of line blow off.

Recycled Water Use Exhibit (RWUE)

The RWUE is used when the final land use and associated landscape systems are defined. The RWUE is used for determining the pipeline size and alignment and service connection size and location. All parcels within the tract shall be categorized as one of the following:

- Park or School – dedicated areas that will include functional turf
- Common Landscape – dedicated landscape areas such as streetscape, slopes, or basins that will not include functional turf

Peak demand and associated meter size shall be determined as shown in Figure 1. The location of the meter service shall be shown on the RWUE and the distribution piping shall be aligned to provide recycled water service to each landscape system. The minimum pipeline size shall be 8-inch and be verified as adequate through a hydraulic analysis.

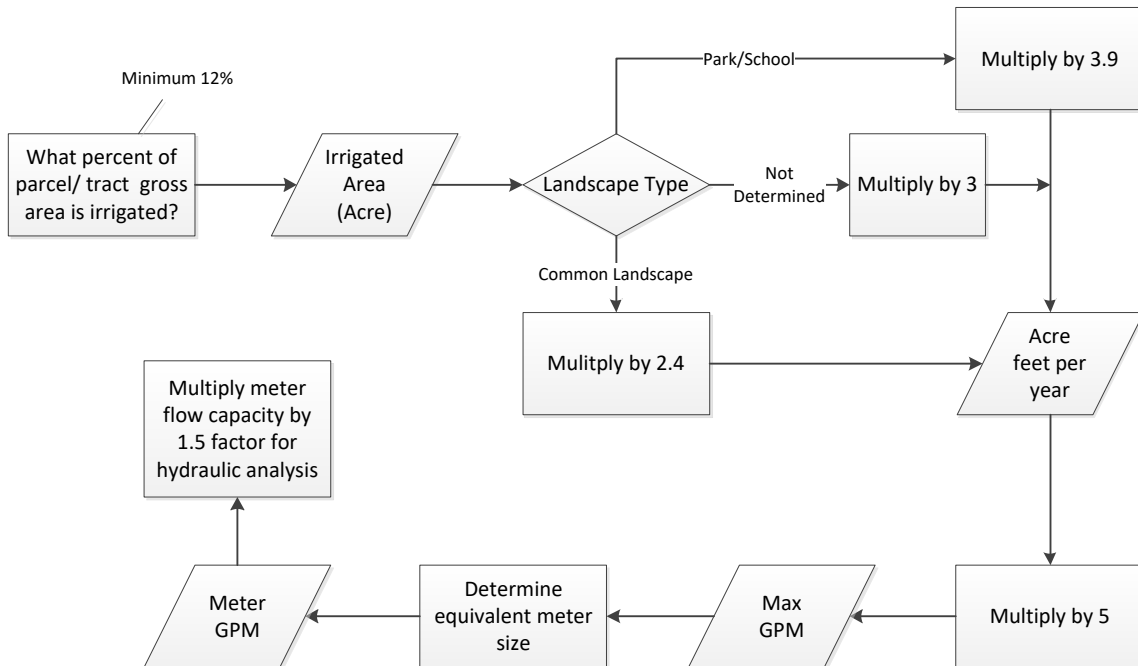


Figure 1

Recycled Water Irrigation Plan (RWIP)

The following formulas shall be used for determining the irrigation demands summarized in the Meter Data Table on the Index Sheet. This table shall be on the same sheet that has the POC reference location.

As of 2015, EMWD requires demand calculates to be completed at 50% of July ETO at the nearest CIMIS Station.

The RWIP identifies specific landscape area information that will be irrigated per valve. The landscape demand formulas are the following:

Irrigation Annual Water Use Demand per Meter

$$\frac{((IA \times ETO \ 0.62 \times 0.5) \ (PF) \ / \ (IE) \ (AE)) \ 325,851}{\text{Acre Feet/Year}} = \text{Demand per Valve (DpV)}$$

Where:

IA = Irrigated Area in square feet (sf) (1 acre = 43,560 sf).

ETO	= Inches of water ETo Historic Annual Evapotranspiration Data for the closest CIMIS Station
0.62	= Conversion factor from inches per square foot (sf) to gallons
0.5	= Adjustment Factor, 50% of Maximum Demand Allowed
325,851	= Conversion from gallons to acre feet (325,851 gallons =1 acre foot)

PF = Plant Factor

0.8 for turf and High Water use plant type

0.5 for Medium Water use plant type

0.3 for Low Water use plant type

IE = Irrigation Efficiency Factor

0.9 for drip irrigation

0.75 for rotor irrigation

0.7 for combination irrigation

0.6 for spray irrigation

AE = Application Efficiency Factor

0.9 for Smart Controller Et based with rain shut off

Total the Sum of all valves ran in series Valve Demands (DpV) per meter,
example;

$(DpV) + (DpV) + (DpV) + (DpV) = \text{Total Demand in Acre Feet/Year per Meter}$

The Maximum Irrigation Peak Demand Allowed shall not exceed the sum of the total number of valves running simultaneously as designed. Systems shall be designed so as to minimize the number of valves running simultaneously while ensuring compliance with watering window restrictions.

The water budget calculated at the RWIP level sets the Maximum Irrigation Demand and the Maximum Peak Demand for each Meter. As a result, EMWD will confirm the demands for each meter do not exceed the demands as conditioned by the RWUE.

EMWD may require more focused studies to calculate the water budget demands depending on the specific project conditions.

Section 3. AutoCAD Drawing Standards

Due to the large number of landscape architecture and civil engineering firms that will take part in the creation of the RWUP, RWUE, and RWIP, EMWD has developed AutoCAD drawing standards to maintain consistency in content and appearance to meet regulatory compliance and data collection objectives. EMWD integrates the RWUP, RWUE, and RWIP data into Geographic Information Systems (GIS). In an effort to assist the Applicant and their Consultants, EMWD developed the following standards along with the entire EMWD Recycled Water Landscape Guideline Toolbox. This Toolbox includes standard drawing files and examples. For the complete contents of this Toolbox, please refer to Section 8 of the Recycled Water Irrigation Guideline.

General Standards

1. All CAD Submittal Packages shall be in AutoCAD 2007 or newer.

2. Sheet Size and Limit Standards

a. RWUP

- i. The minimum sheet size is 24" x 36" as a single sheet or as multiple sheets.
- ii. The maximum scale is 1" = 300' as a single sheet.
- iii. The RWUP shall be developed on a single standard sheet size whenever possible. However, if due to the size of the project the RWUP may be comprised of multiple sheets.

b. RWUE

- i. The minimum sheet size is 24" x 36" as a single sheet or as multiple sheets.
- ii. The maximum scale is 1" = 100' as a single sheet.
- iii. The RWUE shall be developed on a single standard sheet size whenever possible. However, if due to the size of the project the RWUE may be comprised of multiple sheets.

c. RWIP

- i. The sheet size shall be 24" x 36".
- ii. Index sheet maximum scale is 1" = 50' as a single sheet.
- iii. Irrigation sheets maximum scale is 1" = 20'. The scale of 1" = 30' may be used only with EMWD prior written approval.

d. RWUP/RWUE/RWIP Multiple Sheet Standards

In order to maintain a clear understanding of the exhibit/plan set, multiple sheet submittals shall include the following items:

- i. Match lines shall be clearly displayed where a portion of the exhibit is to be continued and read as follows: "Matchline A – See Sheet 2"
- ii. Sheets shall be numbered consecutively as follows on the Standard Title Block: Sheet 1 of 3, Sheet 2 of 3, Sheet 3 of 3.

3. File Submittal Standards

All CAD Submittal Packages shall include the following data in AutoCAD:

- a. RWUP files shall include;
 - i. EMWD Title Block
 - ii. Base Drawing File (Civil drawing)
 - iii. RWUP Drawing File (Master file)
 - iv. Pen Table
 - v. Study Area Summary Tables (Excel file)
- b. RWUE files shall include;
 - i. EMWD Title Block
 - ii. Base Drawing File (Civil drawing)
 - iii. RWUE Drawing File (Master file)
 - iv. Pen Table
 - v. Project Summary Table (Excel file)
- c. RWIP files shall include;
 - i. EMWD Title Block
 - ii. Title Sheet File (Cover Sheet)
 - iii. Base Drawing File (Civil drawing)
 - iv. Recycled Water Irrigation Plan (One file per POC)
 - v. Potable Water Irrigation Plan (If any, one file per POC)
 - vi. Sheet Index Drawing File (One file per POC)
 - vii. Valve Demand Table (Excel file)
 - viii. Meter Data Table (Excel file)
 - ix. Pen Table
 - x. Domestic and Fire Mainline Plumbing

4. General File Standards

All drawings shall be comprised of 1 Master Drawing AutoCAD file (RWUP, RWUE, or RWIP) with 2 AutoCAD files as external references (Base and Title Block). The Base and Title Block files shall remain as external references and shall not be inserted or bound into the Master Drawing.

- a. Base File:
 - i. A single Base file (Civil Drawing) shall be used in the RWUP, RWUE, and RWIP
 - ii. The AutoCAD Base file shall consist of but is not limited to the following items:

- a) Civil site plan, project topography, base map, buildings, street centerline & station, curb & gutter, sidewalk, right-of-way, lot lines, existing /proposed potable & recycled water mainlines, service lateral lines, and sleeves.
 - b) Plumbing plan: all private onsite water piping (domestic, fire, water feature, well, etc.).
- b. Standard Title Block File:
- i. The AutoCAD Standard Title Block file shall be set up as listed in the Standard Sheet Drawing Setup.
 - ii. The Standard Title Block file shall be named with the Work Order number assigned by EMWD followed by “_TITLE BLOCK”. If the Work Order number has not been assigned, use the example below to name the Title Block file temporarily until the number is issued.

Example: “XXXXX_TITLE BLOCK”

- c. RWUP File:
- i. The AutoCAD Master Drawing file model space shall have the Base file inserted as an external reference. Refer to #6 below.
 - ii. AutoCAD RWUP files (Layout or Paper Space Portion) shall have the Standard Title Block file inserted into them as external references.
 - iii. RWUP files shall be named with the Work Order assigned by EMWD followed by “_RWUP”. If the Work Order number has not been assigned, use the example below to name the RWUP file temporarily until the number is issued.

Example: “XXXXX_RWUP”

- d. RWUE File:
- i. The AutoCAD Master Drawing file model space shall have the Base file inserted as an external reference. Refer to #6 below.
 - ii. AutoCAD RWUE files (Layout or Paper Space Portion) shall have the Standard Title Block file inserted into them as external references.
 - iii. RWUE files shall be named with the Work Order assigned by EMWD followed by “_RWUE”. If the Work Order number has not been assigned, use the example below to name the RWUE file temporarily until the number is issued.

Example: “XXXXX_RWUE”

e. RWIP File:

- i. The AutoCAD Master Drawing file model space shall have the Base file inserted as an external reference. Refer to #6 below.
- ii. The AutoCAD irrigation sheet index map and irrigation plan (model space) shall contain the Base file, plumbing file, & architect file (if any) as external references. Each recycled and potable POC shall have their unique drawing files.
- iii. The AutoCAD irrigation sheet index map and irrigation plan (layout or paper space) shall have the Standard Title Block file inserted as external references.
- iv. The AutoCAD irrigation sheet index map and irrigation plan file shall be named with the EMWD Inspection Work Order. The EMWD Plan Check Work Order shall not be used in the file's name. If the Work Order number has not been assigned, use the example below to name the file temporarily until the number is issued.

Example: "XXXXX_RWIP"

5. Title Block Standards

All projects and all drawings shall utilize the EMWD Standard Title Block (24" x 36") and information.

a. Standard Title Block Components (All Sheets)

- i. Sheet number and total number of sheets
- ii. EMWD D-Sheet # Number
- iii. Current California Registered and Licensed Landscape Architect and/or Civil Engineer Information, Stamp, and Signature Block (Signed)
- iv. EMWD Approval Block
- v. EMWD Revision Block
- vi. EMWD Project Title Block (lower right hand corner)
- vii. General Project Information:

The type of project (RWUP, RWUE, or RWIP) shall be noted in the Title Block as well as provide the Tract Number, Parcel Number, APN #, the County or City Project Jurisdiction and Project Name for the Title Block.

- viii. Work Order Number (WO# XXXXX):

The Work Order number is a tracking number assigned by EMWD. A separate WO # will be issued for each type of plan submittal, i.e., RWUP, RWUE, RWIP, and Inspections.

ix. I.D. Number Reference:

The I.D. number is a tracking number assigned by EMWD in reference to the Improvement District. The I.D. number is assigned to the project when the application and deposit has been submitted and accepted by EMWD.

x. Service Area (S.A.) Number Reference:

The S. A. number is a recycled service area zone number used by EMWD.

xi. Coordinate Number Reference:

The Coordinate number is a District mapping number use by EMWD.

xii. Benchmark:

Refers to Surveyors External Reference Standards in this section

xiii. County / City / Agency Signature Block

xiv. Dig Alert Information

xv. Drawn by, Checked by and Current Date:

Provide initial of the person drawing and checking the plans. Revise the date for each submittal.

xvi. A sample of the EMWD Standard Title Block is provided within the Toolbox.

6. Drawing Set Up Standards

a. Drawing Scale and Units

- i. A North Arrow symbol and “bar” type scale shall be included on each drawing sheet. Refer to the example of the Title Block in the Toolbox.
- ii. The Drawing Units for the Base file and the Master Drawing file (RWUP, RWUE, and RWIP) need to be set to Decimal, with a precision of 0.000.
- iii. The RWUP, RWUE, and RWIP Drawing Files shall be drawn at an Engineer’s scale using 1 unit = 1’
- iv. Base file shall maintain its true north orientation in model space. If the current orientation of the Base file in AutoCAD model space is such that rotation is necessary to properly fit all line work onto one sheet or within the Standard Title Block, the rotation shall be completed through the viewport in

Layout (Paper) Space using the AutoCAD “DVIEW” command. Not rotated in model space.

b. External Reference Set Up Standards

- i. All external referenced drawings (Base file) shall be created in the model space and tied to the Horizontal Datum and Vertical Datum as defined below:
 - a) All AutoCAD Drawings shall be tied to the Horizontal Datum of the California State Plane Coordinate System Zone 6 (NAD 83) and to the North American Vertical Datum (NAVD 88). Units of measure shall be English units unless otherwise directed. Drawing units shall be Decimal.
- ii. The visretain variable shall be set to “0” on all referenced drawings.
- iii. All external reference files shall have nothing in layout (paper) space.
- iv. Any and all unused layers, blocks, or external reference files shall be removed and purged from the drawing file.
- v. External reference drawings are to be kept in the same folder in which the Master file that they are being inserted into is located and be inserted as described below:
 - a) Using AutoCAD external reference overlay function, through the Xref manager, attach external references to the Master Drawing. The Master Drawing should be set at “world” through the Universal Coordinate System (UCS).
 - b) The external reference (Base file) shall be inserted into the model space of the Master Drawing at X,Y,Z insertion point, 0,0,0.
 - c) The Standard Title Block Insertion:
 - i. The Standard Title Block shall be inserted into the layout (paper) space of the Master Drawing.
 - ii. The Standard Title Block shall be inserted into layout space at a scale of 1:1 and X, Y, Z insertion point of 0, 0, 0.
 - iii. Line type scaling shall only be adjusted by the layer and/or the line itself in the drawing in which it originates.
 - iv. Line type scaling for all drawings will be as follows:
 1. “LT” scale for all drawings is set at “1”
 2. “PSLTSCALE” is set to “0”
 - d) Both drawings shall be inserted at X, Y, Z, insertion point of 0, 0, 0 and the universal coordinate system (UCS) should be set at (world).

c. Standard Viewport Development

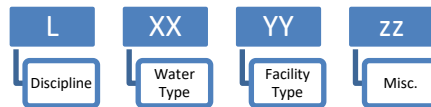
The layout of the drawing shall contain a viewport created on the P_VIEWPORT layer for the RWUP, the E_VIEWPORT layer for the RWUE, or the SI_VIEWPORT layer for the sheet index. This layer shall be set to the “non-plot” option in the layer manager window. The “base” drawing will be brought through the view viewport at the appropriate zoom factor shown as follows:

Paper Space Scale:	Zoom Factor:
1" = 20'-0"	1/20xp
1" = 30'-0"	1/30xp
1" = 40'-0"	1/40xp
1" = 50'-0"	1/50xp
1" = 60'-0"	1/60xp
1" = 80'-0"	1/80xp
1" = 100'-0"	1/100xp
1" = 200'-0"	1/200xp
1" = 300'-0"	1/300xp

7. Layer Name Standards

The layer naming convention to be used for each drawing shall be as follows:

- a. Layer names shall be named in association with the drawing discipline initial (“L” for Landscape, “C” for Civil, “P” for Potable Plumbing) first, the type of water second, the facility type (i.e. Meter, Isolation Valve, Strainer, etc.) third, and finally any additional information, if needed.
- b. All layer names created in the AutoCAD layer manager shall be in capital lettering.
- c. Each word shall be separated by an underscore “_”. There shall be no spaces in between words. See example below and CAD Layers and Blocks file in the Toolbox.



Example: L_XX_YY_ZZ = L_RW_MAIN_EXIST, C_RW_ISOLATION_VALVE,
L_WTR_METER_POC_A

8. Line Weight, Pen Assignment, Plotting and Font Standards

- a. A pen assignment shall be submitted with a CAD file. This pen assignment is created by designing firms and are the settings that were used in the drawing’s creation
- b. Standard Fonts
 - i. All exhibits and plans shall use a standard AutoCAD font and font style for all labels, call-outs, and attributes associated with them. The standard font and font style are;
 - a. Font: Calibri
 - b. Style: Standard
 - ii. Font sizes shall be adjusted in accordance with the drawing scale that is assigned to each plan. The creator of each plan shall use his or her own judgment when adjusting font sizes to make the plans clear and legible for the end user(s). Bold and italic typefaces may also be assigned to fonts when necessary.
 - iii. Minimum font sizes shall be 1/16” for vicinity map text and 1/10” for all other text used.

- iv. Orient text and lettering normal to the reading plane, or parallel to the line that is referenced. Text orientation standards are shown in the example

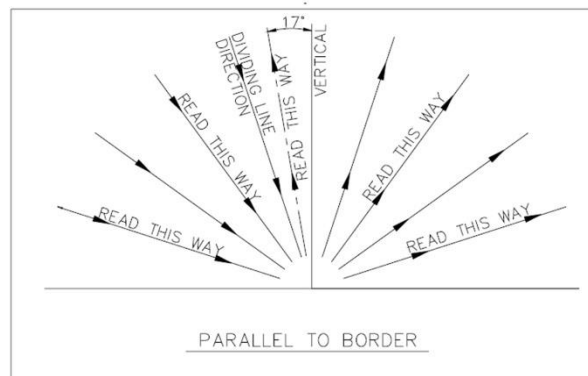


diagram below.

Note: This illustration is provided only to portray how this example should appear. Fonts, line weights, and scale may differ when plotted.

- c. Standard Plotting
 - i. All plans shall be submitted to EMWD as full size PDF files. The DPI of the PDF shall be such that all text and line weights are legible as directed by EMWD.
- d. Line Type Standards
 - i. All symbols used for all plans shall be from EMWD's Standard Line Type.
 - ii. EMWD Standard Line Types shall be defined in the Layer Properties Manager.
 - iii. Line types shall be per the CAD Standard within the Toolbox.
 - iv. Each line type created in the Layer Properties Manager will use the default layer type 'Continuous', unless otherwise specified in the EMWD Standard Line Types Legend.
 - v. The line type scale shall be adjusted in AutoCAD's Properties Manager in accordance with the drawing scale that is assigned to each drawing to make the line types clear and legible.
- e. Block Standards
 - i. All symbols used for all plans shall be per EMWD Standard Blocks.
 - ii. EMWD Standard Blocks are available in the Toolbox. In the case that new blocks need to be created, the following Block Standards shall be used.
 - a) All blocks shall be legible and clearly understood on the printed exhibit or plan
 - b) Blocks shall be created on the corresponding layer.
 - c) All blocks shall be "named" with EMWD standard naming nomenclature, refer to the Toolbox.

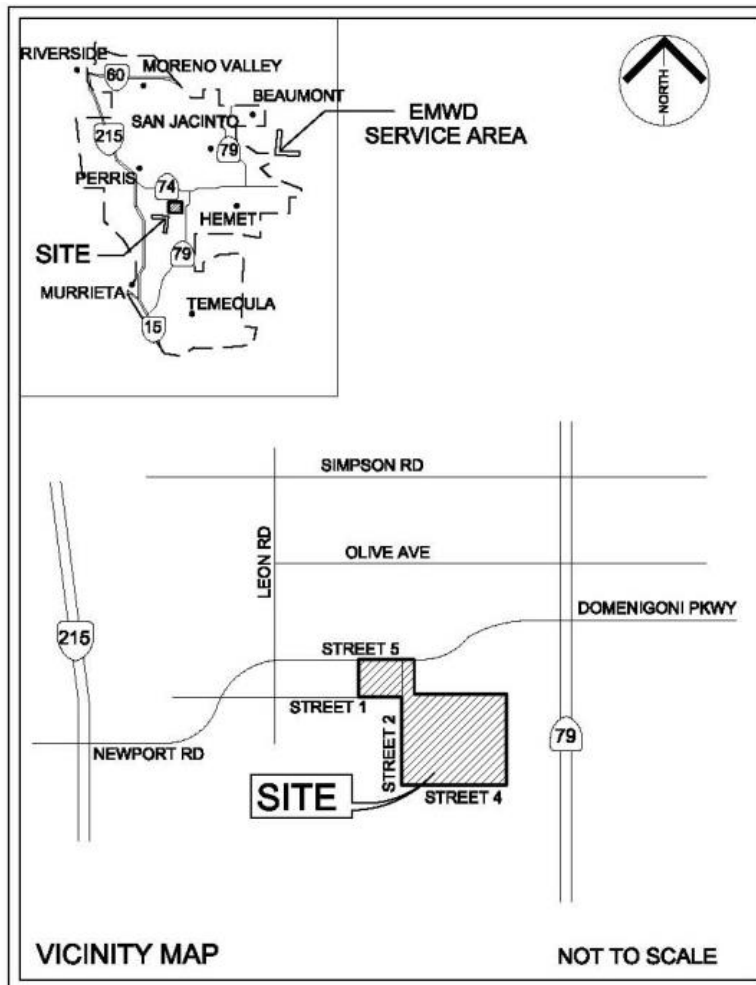
- d) Separate Blocks shall be created for potable and recycled appurtenances and placed on separate potable and recycled layers.
 - e) The minimum height / length of a block shall be 1/8" in size in paper space.
 - f) The minimum text height for blocks shall be 1/8" in paper space.
 - g) The insertion point for every block shall be the center of the object being converted into a block.
- f. Polygon/Polyline Standards
- i. All polygons/polyline that define a specific area or boundary shall be closed polygons.
 - ii. All irrigated area shall be closed polygons.
 - a) Irrigated area refers to all planting areas, turf areas, and water features in a landscape design plan subject to the water demand calculation.
 - b) Irrigated area does not include footprints of buildings, structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or impervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open space and existing native vegetation).
 - iii. All closed polygons/polyline created for the RWUP, RWUE, and RWIP shall be placed on the associated layer with the Standard Layer Name for that Drawing file. Refer to the Toolbox.
 - iv. All closed polygons/polyline created for the RWUP shall be created on the corresponding layer named for that hatch or area it is defining (per Study Area). Refer to the color and hatch pattern standards in this section.
 - v. All closed polygons/polyline created for the RWUE shall be created on the corresponding layer named for that hatch or area it is defining (per POC). Refer to the color and hatch pattern standards in this section.
 - vi. All closed polygons/polyline created for the RWIP shall be:
 - a) Created on the corresponding layer named for the area it is defining (per POC). The layer shall be set as a non-plot layer.
 - b) Created on the corresponding layer named for the area it is defining (per Valve Number). The layer shall be set as a non-plot layer. For valves that use bubblers, identify the irrigated area by using a 6' diameter closed polygon for EMWD demand calculations.
- g. Color Standards
- i. The RWUP and RWUE Drawings are printed in color and shall utilize the color hatch and line types as a visual delineation of the components.

- ii. All colors used in the creation of the color hatch and color line types shall utilize the color designation “color by layer” per EMWD Standard. **Do not use purple for potable water.**
 - iii. The color hatch pattern shall be defined by a closed polygon/polyline of the matching associated hatch color. EMWD will not accept color hatches defined by “extents” or any other method.
 - iv. The color hatch pattern shall be set to “solid” in the AutoCAD Boundary Hatch and Fill Window.
- h. Callout Standards
- i. All callouts used for all plans shall be EMWD Standard Font and Font Height.
 - a. Text for all callouts shall be created on the text layer: TEXT_1, TEXT_2, and so on.

Standard Maps, Legends, Tables, Notes, and Details

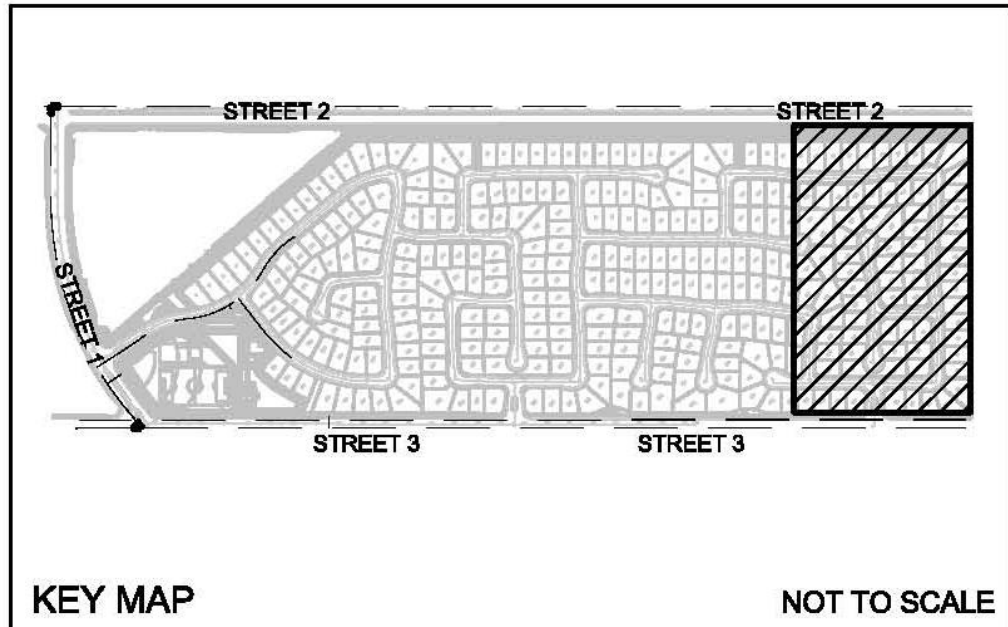
1. Vicinity Map

- a. The Vicinity Map shall be located in the top right corner of the RWUP, RWUE, and RWIP Title Sheet
- b. The Vicinity Map will be created on one layer only, using a variety of colors for clarity
- c. All text shall be a minimum size of 1/16"
- d. The top left corner of the Vicinity Map shall show the project location in relation to the entire EMWD Service Area
- e. The larger map shall show the project location in relation to nearest cross streets and a minimum of (2) major arterial roads, highways, or freeways.



2. Key Map

- a. The Key Map shall be shown on all plan sheets within the RWIP Set. The Key Map shall be located in the same location on every sheet, when possible.
- b. The Key Map will be created on one layer only using a variety of colors for clarity, with the exception of the viewport showing the entire site.
- c. All text shall be a minimum size of 1/16".
- d. The Key Map shall show the entire project limits with all major streets labeled.
- e. The area being displayed on that particular sheet shall be hatched with pattern 'ANSI31'. The scale of the hatch pattern shall be such that the base information is still noticeable below the hatch.



3. Legends

- a. The Legend shall describe each line or block as it relates to the overall exhibit or plan.

4. Tables

- a. The tables are created in Excel and are available in the Toolbox. The Excel file shall be saved and sent to EMWD with the AutoCAD file for submittal.
- b. The tables shall be filled out in Excel and inserted into the AutoCAD file.
- c. If the table requires a solid hatch color of a service area, or irrigated area, the hatch shall be drawn in AutoCAD and placed above the table.

5. Notes

- a. The notes shall be created on the layers TEXT_NOTES1, TEXT_NOTES2, and so on.
- b. The text size for the notes shall be a minimum of 1/10" in height.
- c. EMWD has developed standard notes that correspond to each exhibit or plan.
- d. The standard notes are required to be within the RWUP, RWUE, and specific sheets for RWIP.

6. Details

- a. EMWD has created typical details specific to each exhibit and project type.
- b. Details shall be added to the drawing.

RWUP Standards

The RWUP is printed in color and the standards are as follows:

1. Line Types, Blocks, Colors, Legends, Notes and Details

a. Standard RWUP Line Types

- i. All symbols used for the RWUP shall be either a Standard Line Type or a Standard Block.
- ii. Standard AutoCAD line types are as follows:

Study Area Limit Line



Standard Line type: DASHED 2

Project Study Area Phasing



Standard Line type: DASHED

Parcel Property Lines



Standard Line type: PHANTOM

Existing Potable Water Mainline



Standard Line type: DASHED

Proposed Potable Water Mainline



Standard Line type: CONTINUOUS

Existing Recycled Water Mainline




Standard Line type: DASHED


Proposed Recycled Water Mainline



Standard Line type: CONTINUOUS

- iii. The scale and width at which each line type listed above is displayed will be determined by the scale at which the RWUP is setup. The line type scale shall be adjusted, to match that of the RWUP examples.
- b. Standard RWUP Blocks
 - i. All symbols used shall be either a Standard Line Type or a Standard Block.
 - ii. Standard Block development convention shall be used in the creation of the blocks for each of the drawing files. Refer to the Toolbox.
- c. Standard RWUP Colors
 - i. The following AutoCAD standardized colors shall be used as a visual delineation of the recycled and potable facilities (existing and proposed) on the RWUP. These standard colors shall also apply to the standard symbols used to designate the location of proposed potable and recycled water meters.

 153 (Potable)

 203 (Recycled)

- ii. The following AutoCAD colors are examples of hatch patterns to be used to delineate between the different study areas defined on the RWUP.

 221

 53

 33

 62

 66

- iii. Hatch colors may include alternative hatch colors. If hatch colors are to be repeated, study areas adjacent to one another shall have different hatch colors to give a visible boundary between the two.

d. Standard RWUP Legend

The following list of items shall be identified on the RWUP Legend, at a minimum and if applicable:

- i. Study Area Limit Line
- ii. Project Study Area Limit Line
- iii. Properties to be Served
- iv. Proposed Potable Water Mainline. (Label size of line on plan)
- v. Proposed Recycled Water Mainline. (Label size of line on plan)
- vi. Existing Potable Water Mainline. (Label size of line on plan)
- vii. Existing Recycled Water Mainline. (Label size of line on plan)

e. Vicinity and Key Map

- i. The Vicinity Map and Key Map shall be placed on every sheet of the drawing.

f. Standard RWUP Notes

- i. The RWUP Standard Notes shall be placed within the drawing.
- ii. The Standard Notes shall not be altered or modified by the user. Refer to the Toolbox for notes.

g. Standard RWUP Details

- i. The RWUP is a Master Plan and as a result, schematic details for the specific project may be required by EMWD.
- ii. If the project requires a temporary connection to a potable water mainline, the Standard EMWD Temporary Intertie Detail shall be placed on the RWUP. Refer to the Temporary Intertie Detail in the Toolbox.

2. Standard RWUP Example

- a. An example representing the Standard Data Summary Tables, Standard Legend, Standard Notes, and a typical RWUP is shown in the Toolbox.


RWUE Standards

Refer to the General Standards at the beginning of this Section for standards to be included in preparing the RWUE. The RWUE is printed in color and the standards are as follows:

1. Line Types, Blocks, Colors, Legends, Notes and Details


a. Standard RWUE Line Types


- i. All symbols used for the RWUE shall be per EMWD Standard Line Type.
- ii. Standard AutoCAD Line Types shall be used in the creation of the Recycled Water Use Exhibits as follows:


Project Site Area Limit Line 
Standard Line type: DASHED 2


Parcel Property Lines 
Standard Line type: PHANTOM

Project Phasing 
Standard Line type: DASHED

Existing Potable Water Mainline 
Standard Line type: DASHED

Proposed Potable Water Mainline 
Standard Line type:
CONTINUOUS

Existing Recycled Water Mainline 
Standard Line type: DASHED

Proposed Recycled Water
Mainline 
Standard Line type:
CONTINUOUS

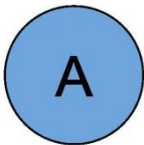
- iii. The scale and width at which each line type listed and displayed above will be determined by the scale at which the RWUE is setup. The line type scale shall be adjusted to match that of the RWUE examples.

b. Standard RWUE Blocks

- i. All symbols used for all plans shall be per EMWD Standard Blocks.
- ii. Standard Block development convention shall be used in the creation of the blocks for each of the drawing files.
- iii. Standard RWUE Blocks to be used for the RWUE Exhibits are as follows (refer to the Toolbox for complete legend);



Block Name: C_RW_METER



Block Name: C_WTR_METER





Block Name: C_WTR_BACKFLOW

c. Standard RWUE Colors


- i. Standard colors shall be used as solid color hatch patterns on the RWUE to delineate between the irrigated potable water area and the irrigated recycled water areas.
- ii. Standard colors shall be used as color line types on the RWUE to delineate between the potable water and recycled water facilities and Points of Connection.


- iii. The following AutoCAD standardized colors shall be used as hatches to delineate between areas irrigated with potable water and areas irrigated with recycled water shown on the RWUE. These standard colors shall also apply to the standard symbols used to designate the potable and recycled water facilities (proposed and existing) and meter location symbols.


 153 (Potable Only)


 203 (Recycled Only)


- iv. The following AutoCAD standardized colors are examples of hatch patterns to be used to delineate between areas that are irrigated with recycled water, but on separate meters within the same RWUE:

 221 (Recycled Only)

 53 (Recycled)

 33 (Recycled)

 62 (Recycled)

 66 (Recycled)

- v. If an area that is being irrigated with potable water is adjacent to an area being irrigated with recycled water, or two areas adjacent to each other are being irrigated by separate water meters with the same type of water use two different hatch colors to create a visible boundary between the two areas.

d. Standard RWUE Legend

The following list of items shall be identified on the RWUE Legend, at a minimum and if applicable:

- i. Project Site Area Limit Line
- ii. Tract Limit Line
- iii. Proposed Potable Water Pipeline (Label size of line on plan)
- iv. Proposed Recycled Water Pipeline (Label size of line on plan)
- v. Existing Potable Water Pipeline (Label size of line on plan)
- vi. Existing Recycled Water Pipeline (Label size of line on plan)
- vii. Proposed Potable Water Meters
- viii. Proposed Recycled Water Meters
- ix. Isolation Valves
- x. Fire Hydrants
- xi. Reduced Pressure Backflows
- xii. Sleeving
- xiii. Plumbing to Building(s), Drinking Fountains, Fire Systems, Domestic Water Systems, Water Feature, etc.

e. Vicinity and Key Map

- i. The Key Map shall be placed on every sheet of the drawing.

f. Standard RWUE Notes:

- i. The RWUE Standard Notes shall be placed within the drawing.
- ii. The Standard Notes shall not be altered or modified by the user. Refer to the Toolbox for notes.

2. Standard RWUE Examples

- a. An example representing a Standard Data Summary Table, Standard Legend, Standard Notes, and common types of RWUEs are provided in the Toolbox.

RWIP Standards

Refer to the General Standards at the beginning of this Section for preparing the RWIP. The RWIP is printed in black and white on bond paper. Once accepted, a wet signed bond copy is requested for EMWD acceptance signatures. EMWD will provide a signed copy at the preconstruction conference. The original signed copy shall be kept at EMWD. The standards are as follows:

1. Line Types, Blocks, Legends, Maps, Tables, Notes and Details

a. Standard RWIP Line Types

- i. All symbols used for the On Site Recycled Water Irrigation Plan (RWIP) shall be per EMWD Standard Line Type.
- ii. Standard AutoCAD Line Types are as follows:

Project Site Area Limit Line



Standard Line type: DASHDOT2
CAD Standard Color: 41

Sheet Boundary Reference



Standard Line type: DASHED2

Project Phasing



Standard Line type: DASHED

Potable Water Mainline (Irrigation)



Standard Line type: DASHED2

Proposed Potable Water (Plumbing)
Mainline



Standard Line type: DASHDOT2

Existing Recycled Water Mainline



Standard Line type: DASHED2

Proposed Recycled Water Mainline



Standard Line type: CONTINUOUS

- iii. The scale and width at which each line type listed and displayed above will be determined by the scale at which the Index map and Base maps are setup. The line type scale shall be adjusted, to match that of the RWIP examples.
- b. Standard RWIP Blocks
 - i. All symbols used shall be per the EMWD Standard Block.
 - ii. Standard Block development convention shall be used in the creation of the blocks for each of the drawing files. Refer to the Toolbox for Standard RWIP Blocks to be used.
- c. Polygon Standards
 - i. Closed polygons shall define the boundaries of the following items at a minimum:
 - ii. The property boundary, each recycled POC irrigated area, per irrigation control valve, and each potable POC irrigated area on the POC Drawing file for the associated POC. Refer to the layer names in this section for the layer name associated with the polygon.
- d. Sheet Index Map
 - i. The Sheet Index Map shall directly follow the Title Sheet in the RWIP Drawing set. The Sheet Index Map is the overall project site and the irrigation system. Refer to the Toolbox for an example of the Sheet Index Map.
- e. Sheet Index Legend

The following list of items shall be identified on the Sheet Index Legend at a minimum and if applicable:

 - i. Project Site Area Limit Line
 - ii. Project Phasing
 - iii. Proposed Potable Water Pipeline. (Label size of line on plan)
 - iv. Proposed Recycled Water Pipeline. (Label size of line on plan)
 - v. Existing Potable Water Pipeline. (Label size of line on plan)
 - vi. Existing Recycled Water Pipeline. (Label size of line on plan)
 - vii. Isolation Valve
 - viii. Air Vac
 - ix. Blow Off
 - x. Fire Hydrant
 - xi. Potable Water Meter
 - xii. Potable Backflow Device
 - xiii. Potable Pressure Reducing Valve
 - xiv. Potable Master Valve
 - xv. Potable Flow Sensor
 - xvi. Potable Remote Control Valve

- xvii. Potable Quick Coupler Valve
- xviii. Recycled Water Meter
- xix. Recycled Strainer
- xx. Recycled Booster Pump
- xxi. Recycled Double Check
- xxii. Recycled Chemigation/Fertigation
- xxiii. Recycled Master Valve
- xxiv. Recycled Flow Sensor
- xxv. Recycled Remote Control Valve
- xxvi. Recycled Water Signage
- xxvii. Recycled Quick Coupler Valve
- xxviii. Sleeves
- xxix. Water Feature(s)
- xxx. Drinking Fountain

f. Vicinity and Key Map

- i. Refer to the AutoCAD Standards at the beginning of this section.

g. Standard Irrigation Tables

- i. POC Meter Data Table

The POC Meter Data Table shall be shown on the plan sheet where the POC connection is shown. A sample of the POC Meter Data Table is shown in the Toolbox in the examples.

- ii. Irrigation Valve Demand Table

The Irrigation Valve Demand Table shall be shown on the Details Sheets of the Irrigation Plans. This table lists the valves numbers and types, GPM, run time, types of plants to be watered, and estimated area of irrigation in square feet.

h. Standard Irrigation Notes

- i. Refer to the RWIP section of the Recycled Water Irrigation Guidelines for placement and text.

i. Standard Irrigation Details

- i. Details for all irrigation equipment components shall be included on the plans.
- ii. The following is a list of Recycled Water Irrigation Details provided by EMWD that must be included on the Detail Sheets of the Irrigation Plans at a

minimum, but is not limited to the following as applicable to the system design:

- a) Temporary Potable Water Construction T-meter Detail
- b) Point of Connection (POC) Sequence Detail
- c) Recycled Pipe / Potable Water Pipe Crossing Detail
- d) Trench for Recycled Water Irrigation Mainline and Laterals Detail
- e) Recycled Water Quick Coupling Valve Detail
- f) Recycled Water Irrigation Advisory Sign Detail
- g) Recycled Water POC Stub Out Detail
- h) Manual Flush Valve Detail
- i) Cross Connection Bypass Tee
- j) Recycled Strainer Detail

2. Delta Revisions

Refer to the Section regarding Construction in the Recycled Water Irrigation Guidelines for more information on plan revisions.

- a. Delta Block Standards
 - i. The Delta Block symbol shall be an equilateral triangle with the revision number placed in the center. The 'triangle' shall be .35" (inches) in height (from point to base) with the text height to be .2" (inches).
 - ii. The Delta Block symbol is available in the Toolbox.
 - iii. The Delta Block symbol shall be placed at every location that has changed from the previously approved plans and in the lower right corner of the Title Block Sheet. There shall be **no** revision clouds drawn on the plans.
 - iv. The Delta revision shall be numbered sequentially starting at the bottom of the revision block and the text shall describe the changes to the plan.

Block Name:  DELTA_REVISION_1 (Example)