



Mr. Rob Cline  
MPWMD  
PO Box 85  
Monterey, CA 93942

August 29, 2007

Dear Rob:

Pacific Water Management is pleased to provide the MPWMD with a cost estimate for services to perform for 161 "high priority" landscape water management audits. The estimate is based upon the information provided in your e-mail dated, August 24<sup>th</sup>, 2007.

The estimate identifies three separate audit categories; residential high users, properties with dedicated landscape meters consuming over 20 units, and properties 3 acres in size consuming 32 units, or greater. Each audit will be conducted in accordance with the attached work tasks, as well as the conditions outlined in the audit template. In addition, I anticipate there to be start up costs associated with the project, which include; a sample audit, software to create audit spreadsheets and communication infrastructure.

#### Residential High Users

- **Comprehensive site audit/water budget**  
**\$1,450**

#### 3 Acres/32 Units or Greater

- **Comprehensive site audit/water budget**  
**\$1,950**

#### Dedicated Irrigation Meters Over 20 units

- **Comprehensive site audit/water budget**  
**\$1,950 plus \$50 dollars per station over 24 stations**

#### Start up Costs

- **Sample audit, software to create audit spreadsheets and communication infrastructure.**  
**\$2,500**

Thank you for the opportunity to submit a proposal. Please don't hesitate to contact me if I can answer any questions.

Sincerely,

Bob Costa, CLIA, CGIA

# MPWMD

## Landscape Water Management Audit Template

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### Introductory statement

- Identify the audit purpose, objective, audit process and procedures.

### Field audit/evaluation

- Examine cultural practices and plant material selection for water use efficiency
- Examine system design - evaluate system pressure, sprinkler, emitter spacing and layout, use of hydrozones and nozzle, emission device selection.
- Examine system maintenance - system inspection schedule, arc adjustment, nozzle, emitter performance, system leaks, sprinkler, emitter alignment
- Evaluate system management - review irrigation schedule, use of weather based control systems, use of weather based scheduling, schedule adjustment procedures, use of rain shut off devices

### Site plan

- Provide client/landscape professional with a landscape site map, which identifies each irrigation hydrozone.

### Summary of recommendations for improving water use efficiency

- Provide client/landscape professional with a comprehensive list of recommendations for improving landscape water use efficiency.

### ET based irrigation schedule

- Provide client/landscape professional with an ET based irrigation schedule

### Landscape site water budget

- Provide client with a water budget which:
  - Utilizes the EAW formula
  - Assumes no effective rainfall
  - Establishes site reference ETo generated from MPWMD ET zone chart
  - Utilizes landscape coefficients of .2, .5, .8 - low, medium, high water use
  - Obtain landscape square footage through aerial maps, or field measurements

### Statement of potential water savings

- Provide client with an estimate of water savings potential based upon implementation of water efficiency recommendations.

## **MPWMD**

### **Landscape Management Audit - Work Tasks**

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**Task 1.** - Letters sent by agencies

**Task 2.** - Clients contact contractor

**Task 3.** - Audits scheduled - Contractor request customer and landscape representative to be present for field audit

**Task 4.** - Field Audit is conducted and field data is collected

**Task 5.** - Field data is inputted into the audit spreadsheet

**Task 6.** - Additional data is prepared - site plan, water budget, recommendations and cost savings estimate, ET based irrigation schedule

**Task 7.** - Water management audit report is generated

**Task 8.** - Electronic file sent to District and Cal-Am

**Task 9.** - Audit report is mailed to the client (2) copies

**Task 10.** - Invoices are submitted by contractor monthly

August 29, 2007

Mr. Rob Cline  
PO Box 85  
Monterey, Ca 93942

Dear Rob,

**Subject: Landscape Water Audits**

In response to your e-mail, dated Friday, August 24<sup>th</sup>, I wish to confirm my interest in the MPWMD/Cal-Am Landscape Irrigation Audit project we discussed at our meeting on August 23<sup>rd</sup>.

I understand that in a recent phone conversation with Andy Slack, he implied that I would be engaged in the audit process under the Spot Water Management umbrella, however that is not the case.

Although Andy and I intend to work closely and collaborate on the project to ensure consistency in the process and product, I will personally, as the representative of Pacific Water Management, be conducting each site visit for those properties I represent, as well as produce the landscape site water audit report.

With the schedule you proposed for the completion of the high priority audits, it is imperative that we continue to move through the process without delay. In an e-mail I submitted to you yesterday, I outlined my suggestions for changes to Rule 172. In addition, I summarized my vision of the audit template that I believe adds value, while expediting the auditing process. I am finalizing my cost estimates and expect to respond to your request very soon.

I look forward to the opportunity to work with you and Joe.

Regards,

Bob Costa CLIA, CGIA  
Pacific Water Management

cc: Joe DiMaggio

## Rule 172 - Landscape Water Audits - Recommended Changes

### Section B -1a

- Has a dedicated water meter using over 20 units

### Section B -1c

- Consider a more specific definition of large residential water use

### Section B - 4

- Landscape water audits not conducted by the District, Cal-Am, or their agent must be completed in accordance with the guidelines established in Section B -5

### Section B - 5

- After notification from the District, Certified Landscape Irrigation Auditors, under contract with the District, or Cal-Am, shall arrange on-site visits, to those customers identified in section B-1, to conduct a comprehensive landscape water use evaluation, which shall include the following;
- Plant material selection and cultural practices - evaluate use of plant material and cultural practices for water use efficiency.
- Irrigation system design and performance - evaluate system pressure, sprinkler, emitter spacing and layout, use of hydrozones, and nozzle, emitter and emission device selection.
- Irrigation system maintenance - evaluate system inspection schedule, system leaks, nozzle performance, arc alignment, sprinkler head alignment.
- Irrigation system management - evaluate the use of weather based control systems, of weather based scheduling, schedule adjustment procedures, use of rain shut off devices.

## Rule 172 - Landscape Water Audits - Recommended Changes

### Section B - 5 (continued)

- All field data gathered from the site evaluation must shall be compiled and summarized in a written report.

In addition to the field data summary, the written report shall include:

A site plan, depicting the various irrigation hydrozones, a summary of the recommendations for improving water use efficiency, an ET based irrigation schedule, a landscape water budget using the Estimated Applied Water formula, and a statement of potential water savings.

Upon completion of the report, the contractor shall submit an electronic copy to the District and Cal-Am within (10) days and (2) hard copies to the client.

The contractor shall respond to any questions the client may have concerning the landscape water use audit.

### Section E

- Those Cal-Am customers who have completed a water audit and have an established water budget are exempt the requirements outlined in sub sections E-1 and E-2

## MPWMD Rule 172 Landscape Management Audit Components

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- Identify the audit purpose, objective, audit process and procedures.

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  - Utilizes the EAW formula
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  - Establishes site reference ETo generated from MPWMD ET zone chart
  - Utilizes landscape coefficients of .2, .5, .8 - low, medium, high water use
  - Obtain landscape square footage through aerial maps, or field measurements

### Statement of potential water savings

- Provide client with an estimate of water savings potential based upon implementation of water efficiency recommendations.

### Estimated time spent per residential audit

- Could be billed hourly if so desired by MPWMD
- If estimated costs are higher than budgeted, we can discuss potential deductions/savings off of these/above listed activities included with site visit/water budget/report – i.e. – staff of CAM/MPWMD could handle some responsibility
  
- Administration/contact - 2hrs
- Travel and setup – 2 hrs
- Field evaluation -2 hrs
- Data entry – minimal
- Develop recommendations/estimate water savings -1hr
- Create site plan –2 hrs
- Develop irrigation schedule – 1 hr
- Develop Water budget - 1hr
- Produce report/mail – 1 hr

Total estimated time - 12 hrs. x \$125/hr = \$1500/residential site

- 3 acres/32 units, dedicated irrigation meters, and golf courses would take additional time based on size/# stations/etc.

### Estimated startup costs for SWM

- Could be billed hourly if so desired by MPWMD
- If estimated costs are higher than budgeted, we can discuss potential deductions/savings off of these/above listed activities included with site visit/water budget/report – i.e. – staff of CAM/MPWMD could handle some responsibility
  
- Configure report template with MPWMD/PWM – 5-10 hrs.
- Create sample irrigation site plan – 3-4 hrs.
- Purchase equipment/reconfigure systems to accommodate MPWMD schedule/work - \$1000
- Perform sample site visit/audit with MPWMD/PWM – 5 hrs.
- Produce sample audit with MPWMD/PWM – 5 hrs.

Total estimated startup costs – \$4500

Additional time for consulting, determination of changes in landscape audit requirements, changes to MPWMD rules and/or ordinances will be on an hourly basis for time/travel.



# Landscape Water Management Audit

## Site Profile

Date of Audit:

Client Name:

Client Address:

Type of Facility:

Landscape Manager contact:

Landscape Manager contact phone:

Site location:

System age:

Annual site ETo:

System type(s):

Soil type(s):

Irrigated square footage:

Are water conserving plants utilized?

Is the control system automated?

Is the landscape on a separate meter?

Historical water use:

# Landscape Water Management Audit

## Plant Material - Cultural Practices

Plant material type(s):

Plant material water requirement:

High

Medium

Low

Plant type %:

Turf

Shrubs

Trees/Shrubs

Groundcover

Are water conserving plants utilized?

Is mulch used in landscape beds?

## System Design

Acceptable

Unacceptable

System Uniformity

Head Spacing

Sprinkler/Emitter selection:

System Pressure

Hydrozones

Comments:

# Landscape Water Management Audit

## System Maintenance

Acceptable

Unacceptable

Heads to Grade

Heads Level

System Leaks

Nozzle Performance

Comments:

## System Management

Acceptable

Unacceptable

Maintenance Schedule

Irrigation Scheduling

Staff Training

Use of Technology

Rain Sensor

Comments:

# Landscape Water Management Audit

## Hydrozone Summary

Zone #

Hydrozone description:

Zone square footage:

Plant type(s):

Emission device(s):

Are the sprinklers in the hydrozone the same type?

Zone efficiency:

Zone EAW:

Zone Recommendations:

## Hydrozone Summary

Zone #

Hydrozone description:

Zone square footage:

Plant type(s):

Emission device(s):

Are the sprinklers in the hydrozone the same type?

Zone Efficiency:

Zone EAW:

Zone Recommendations:

# Landscape Water Management Audit

## Water Efficiency Recommendations

System Design and Maintenance

Plant Material & Cultural Practices

System Management & Scheduling

## Water Budget

Gallons

Cu feet

Acre feet

Maximum Applied Water Allotment

Estimated Applied Water - Existing

Estimated Applied Water - Proposed

Historical Water Use