

25. Award RFP-4182-03/BJC – Irrigation Audits Services, to Masuen Consulting, Okeechobee (Not-to-Exceed \$50,000.00/per year).

RFP-4171-02/BJC will provide for the services of conducting irrigation audits for residential properties as described in the scope of services.

This project was publicly advertised and due to the nature of the requirements and specialty of services the County received one (1) proposal from Masuen Consulting, Okeechobee.

The Evaluation Committee, which consisted of Liz Block; Environmental Services; Judy Garrett; Environmental Services/Accounting; Ruth Lala; Environmental Services; Gary Rudolph; Environmental Services; and Roxane Verrechio-Robinson, Environmental Services evaluated the submittal.

The evaluation of the submittals was based on the following criterion:

QUALIFICATIONS:

- The firm's background and experience related to the services required in the RFP documents.
- Shall be certified in the following areas: Master Gardener or provide evidence of a similar level of competency in horticulture; Florida Irrigation Specialist; certified by the Irrigation Association or the Florida Irrigation Society as an Irrigation Auditor.
- Confirmation of references.
- Analysis of two (2) examples of previous irrigation audit reports for residential or small business customers.
- An estimate of workload and staffing. Seminole County expects to contract for approximately 200 audits and reports.
- Capability of conducting business based on a water conservation ethic and deliver a clear, strong, yet tactful water conservation message to customers.
- Working knowledge of xeriscape principles and plant species, as well as water conservation irrigation and methods (e.g. micro irrigation).
- Working knowledge of the functioning and maintenance of rain sensors and irrigation controllers.
- Ability to comply with the following response time:
 1. The Proposer must, upon receiving customer name(s), be able to contact customer(s) and schedule audit(s) within two (2) weeks of the date of receipt.
 2. The Proposer must be able to provide a written report of audit results and diagram of irrigation system to the customer and to Seminole County Environmental Services Department,

Water Conservation Program within two (2) weeks of the date of the audit.

APPROACH TO WORK:

Analysis of the approach to work, activities and work products related to the Scope of Services as understood.

PRICE PROPOSAL:

Cost per zone.

The Evaluation Committee recommends the Board to award the contract to Masuen Consulting, Okeechobee. The contract will become effective the date of its execution and will remain in effect for a period of one (1) year and at the sole option of the County the contract may be renewed for two (2) additional terms not to exceed one (1) year each. The price is fair and reasonable based upon similar contracts with other governmental agencies.

This is a budgeted project and funds are available in account number 087801-53031000 (Water and Sewer, Professional Services). Environmental Services/Water and Sewer and Fiscal Services/Purchasing and Contracts Division recommend the Board to approve the project and authorize the Chairman to execute the agreement as prepared and approved by the County Attorney's Office with no major deviation in terms and pursuant to the requirements of the RFP documents as long as the contract does not exceed \$50,000.00 per year.

**B.C.C. - SEMINOLE COUNTY, FL
RFP TABULATION SHEET**

RFP NUMBER: RFP-4182-03/BJC
 RFP TITLE: Irrigation Audits Services
 DUE DATE: March 19, 2003, at 2:00 P.M.

ALL RFP'S ACCEPTED BY SEMINOLE COUNTY ARE SUBJECT TO THE COUNTY'S TERMS AND CONDITIONS AND ANY AND ALL ADDITIONAL TERMS AND CONDITIONS SUBMITTED BY THE PROPOSERS ARE REJECTED AND SHALL HAVE NO FORCE AND EFFECT. RFP DOCUMENTS FROM THE CONSULTANTS LISTED HEREIN ARE THE ONLY RFP'S RECEIVED TIMELY AS OF THE ABOVE OPENING DATE AND TIME. ALL OTHER RFP DOCUMENTS SUBMITTED IN RESPONSE TO THIS SOLICITATION, IF ANY, ARE HEREBY REJECTED AS LATE.

Response 1		
Masuen Consulting 32801 US Hwy 441 North, #207 Okeechobee, Florida 34972 (863) 467-4115 – Phone (863) 763-9196 – Fax Michele Masuen		
The per zone cost is \$80.00. All inclusive		

The evaluation criteria is as follows:

- **Experience of the Proposer in conducting irrigation audits. Experience to include (0 - 20 Points):**
 - A variety of audit situations and customers (5);
 - Single family homes vs. small business audits (5);
 - Audits have resulted in water use reduction (10).
- **Examples of previous irrigation audit reports (0 – 20 Points):**
 - Completeness of reports (5);
 - Reports are understandable and geared to the appropriate audience level (5);
 - Reports provide information that expands the customer's understanding of their irrigation system and ability to reduce water use (10).
- **Demonstration of staffing capability to perform required services and handle workload as indicated in the scope of services (0 – 30 Points).**
- **Demonstrated experience and readiness to provide recommendations that would change customer's landscaping in ways that resulted in water use reduction (0 – 30 Points).**

Posted: 3/19/2003: Recommendation for Award: Masuen Consulting 04/03/2003 (BCC Date 04/22/2003)

DRAFT

IRRIGATION AUDITING SERVICES AGREEMENT (RFP-4182-03/BJC)

THIS AGREEMENT is made and entered into this _____ day of _____, 20____, by and between _____, duly authorized to conduct business in the State of Florida, whose address is _____, hereinafter called the "AUDITOR" and **SEMINOLE COUNTY**, a political subdivision of the State of Florida, whose address is Seminole County Services Building, 1101 East First Street, Sanford, Florida 32771, hereinafter called the "COUNTY".

W I T N E S S E T H:

WHEREAS, the COUNTY desires to retain the services of a competent and qualified AUDITOR to provide irrigation auditing in Seminole County; and

WHEREAS, the COUNTY has requested and received expressions of interest for the retention of services of AUDITORS; and

WHEREAS, AUDITOR is competent and qualified to furnish consulting services to the COUNTY and desires to provide its professional services according to the terms and conditions stated herein,

NOW, THEREFORE, in consideration of the mutual understandings and covenants set forth herein, COUNTY and AUDITOR agree as follows:

SECTION 1. SERVICES. COUNTY does hereby retain AUDITOR to furnish professional services and perform those tasks as further described in the Scope of Services attached hereto and incorporated herein as Exhibit "A".

SECTION 2. COMPENSATION AND PAYMENT.

(a) The COUNTY agrees to compensate AUDITOR for the professional services called for under this Agreement a fee not to exceed the sum of _____. AUDITOR shall perform all work required by the Scope of Services but, in no event, shall AUDITOR be paid more than the

negotiated Fixed Fee amount stated above. The AUDITOR shall be compensated at the rate as indicated in Exhibit "B", attached, Rate Schedule.

(b) Payments shall be made to the AUDITOR when requested as work progresses for services furnished, but not more than once monthly. AUDITOR may invoice amount due based the required services actually performed and completed. Upon review and approval of AUDITOR's invoice, the COUNTY shall, within thirty (30) days of receipt of the invoice, pay AUDITOR of the approved amount.

SECTION 3. BILLING AND PAYMENT.

(a) AUDITOR shall render to the COUNTY, at the close of each calendar month, an itemized invoice, properly dated including, but not limited to, the following information:

- (1) The name and address of the AUDITOR;
- (2) Contract Number;
- (3) A complete and accurate record of services performed by the AUDITOR for all services performed by the AUDITOR during that month and for which the COUNTY is billed;
- (4) A description of the services rendered in (3) above with sufficient detail to identify the exact nature of the work performed; and
- (5) Such other information as may be required by this Agreement or requested by the COUNTY from time to time.

The original invoice shall be sent to:

Director of County Finance
Seminole County Board of County Commissioners
Post Office Box 8080
Sanford, Florida 32772

A duplicate copy of the invoice shall be sent to:

Environmental Services Department
500 W. Lake Mary Boulevard
Sanford, Florida 32773

(b) Payment shall be made after review and approval by COUNTY within thirty (30) days of receipt of a proper invoice from the AUDITOR.

SECTION 4. AUDIT OF RECORDS.

(a) COUNTY may perform or have performed an audit of the records of AUDITOR after final payment to support final payment hereunder. This audit would be performed at a time mutually agreeable to AUDITOR and COUNTY subsequent to the close of the final fiscal period in which the last work is performed. Total compensation to AUDITOR may be determined subsequent to an audit as provided for in subsection (b) and of this subsection, and the total compensation so determined shall be used to calculate final payment to AUDITOR. Conduct of this audit shall not delay final payment as required by Section 5(b).

(b) The AUDITOR agrees to maintain all books, documents, papers, accounting records and other evidences pertaining to work performed under this Agreement in such a manner as will readily conform to the terms of this Agreement and to make such materials available at AUDITOR's office at all reasonable times during the Agreement period and for five (5) years from the date of final payment under the contract for audit or inspection as provided for in subsection (a) of this Section.

(c) In the event any audit or inspection conducted after final payment, but within the period provided in subsection (b) of this Section reveals any overpayment by COUNTY under the terms of the Agreement, AUDITOR shall refund such overpayment to COUNTY within thirty (30) days of notice by the COUNTY.

SECTION 5. RESPONSIBILITY OF AUDITOR.

(a) AUDITOR shall be responsible for the professional quality, technical accuracy and the coordination of all plans, studies, reports and other services furnished by AUDITOR under this Agreement. AUDITOR

shall, without additional compensation, correct or revise any errors or deficiencies in his services.

(b) Neither the COUNTY'S review, approval or acceptance of, nor payment for, any of the services required shall be construed to operate as a waiver of any rights under this Agreement or of any cause of action arising out of the performance of this Agreement and the AUDITOR shall be and remain liable to the COUNTY in accordance with applicable law for all damages to the COUNTY caused by the AUDITOR'S performance of any of the services furnished under this Agreement.

SECTION 6. OWNERSHIP OF DOCUMENTS. All deliverable reference data, survey data, plans and reports that result from the AUDITOR's services under this Agreement shall become the property of the COUNTY after final payment for the specific service provided is made to AUDITOR. No changes or revisions to the documents furnished by AUDITOR shall be made by COUNTY or its agents without the written approval of AUDITOR.

SECTION 7. TERM. This Agreement shall take effect on the date of its execution by COUNTY and shall remain in effect for a period of one (1) year. At the sole option of the COUNTY this Agreement may be renewed for two (2) additional terms not to exceed one (1) year each.

SECTION 8. TERMINATION.

(a) The COUNTY may, by written notice to the AUDITOR, terminate this Agreement, in whole or in part, at any time, either for the COUNTY's convenience or because of the failure of the AUDITOR to fulfill AUDITOR's Agreement obligations. Upon receipt of such notice, the AUDITOR shall:

(1) immediately discontinue all services affected unless the notice directs otherwise, and

(2) deliver to the COUNTY all plans, studies, reports, estimates, summaries, and such other information and materials as may have been accumulated by the AUDITOR in performing this Agreement, whether completed or in process.

(b) If the termination is for the convenience of the COUNTY, the AUDITOR shall be paid compensation for services performed to the date of termination. AUDITOR shall be paid no more than a percentage of the Fixed Fee amount equivalent to the percentage of the completion of work contemplated by the Agreement.

(c) If the termination is due to the failure of the AUDITOR to fulfill his Agreement obligations, the COUNTY may take over the work and prosecute the same to completion by Agreement or otherwise. In such case, the AUDITOR shall be liable to the COUNTY for reasonable additional costs occasioned to the COUNTY thereby. The AUDITOR shall not be liable for such additional costs if the failure to perform the Agreement arises out of causes beyond the control and without the fault or negligence of the AUDITOR. Such causes may include, but are not limited to, acts of God or of the public enemy, acts of the COUNTY in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but, in every case, the failure to perform must be beyond the control and without the fault or negligence of the AUDITOR.

(d) If, after notice of termination for failure to fulfill Agreement obligations, it is determined that the AUDITOR had not so failed, the termination shall be deemed to have been effected for the convenience of the COUNTY. In such event, adjustment in the Agreement price shall be made as provided in subsection (b) of this Section.

(e) The rights and remedies of the COUNTY provided in this clause are in addition to any other rights and remedies provided by law or under this Agreement.

SECTION 9. EQUAL OPPORTUNITY EMPLOYMENT. AUDITOR agrees that it will not discriminate against any employee or applicant for employment for work under this Agreement because of race, color, religion, sex, age, national origin, or disability and will take steps to ensure that applicants are employed, and employees are treated during employment, without regard to race, color, religion, sex, age, national origin or disability. This provision shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

SECTION 10. NO CONTINGENT FEES. AUDITOR warrants that it has not employed or retained any company or persons, other than a bona fide employee working solely for the AUDITOR, to solicit or secure this Agreement and that AUDITOR has not paid or agreed to pay any persons, company, corporation, individual or firm, other than a bonafide employee working solely for AUDITOR, any fee, commission, percentage, gift, or other consideration contingent upon or resulting from the award or making of this Agreement. For the breach or violation of this provision, COUNTY shall have the right to terminate the Agreement at its discretion, without liability and to deduct from the Agreement price, or otherwise recover, the full amount of such fee, commission, percentage, gift or consideration.

SECTION 11. ASSIGNMENT. This Agreement, or any interest herein, shall not be assigned, transferred, or otherwise encumbered, under any circumstances, by the parties hereto without prior written consent of the opposite party and only by a document of equal dignity herewith.

SECTION 12. SUBCONTRACTORS. In the event AUDITOR, during the course of the work under this Agreement, requires the services of any subcontractors or other professional associates in connection with service covered by this Agreement, AUDITOR must secure the prior written approval of the COUNTY. If subcontractors or other professional associates are required in connection with the services covered by this Agreement, AUDITOR shall remain fully responsible for the services of subcontractors or other professional associates.

SECTION 13. INDEMNIFICATION OF COUNTY. The AUDITOR agrees to hold harmless, release and indemnify the COUNTY, its commissioners, officers, employees, and agents against any and all claims, losses, damages or lawsuits for damages, arising from, allegedly arising from or related to the provision of services hereunder by the AUDITOR, whether caused by the AUDITOR or otherwise. This hold harmless, release and indemnification shall include any claim based on negligence, action or inaction of the parties.

SECTION 14. INSURANCE.

(a) General. The AUDITOR shall at the AUDITOR's own cost, procure the insurance required under this Section.

(1) The AUDITOR shall furnish the COUNTY with a Certificate of Insurance signed by an authorized representative of the insurer evidencing the insurance required by this Section (Professional Liability, Workers' Compensation/Employer's Liability and Commercial General Liability). The COUNTY, its officials, officers, and employees shall be named additional insured under the Commercial General Liability policy. The Certificate of Insurance shall provide that the COUNTY shall be given not less than thirty (30) days written notice prior to the cancellation or restriction of coverage. Until such time as the insurance is no longer required to be maintained by the AUDITOR, the

AUDITOR shall provide the COUNTY with a renewal or replacement Certificate of Insurance not less than thirty (30) days before expiration or replacement of the insurance for which a previous certificate has been provided.

(2) The Certificate shall contain a statement that it is being provided in accordance with the Agreement and that the insurance is in full compliance with the requirements of the Agreement. In lieu of the statement on the Certificate, the AUDITOR shall, at the option of the COUNTY submit a sworn, notarized statement from an authorized representative of the insurer that the Certificate is being provided in accordance with the Agreement and that the insurance is in full compliance with the requirements of the Agreement.

(3) In addition to providing the Certificate of Insurance, if required by the COUNTY, the AUDITOR shall, within thirty (30) days after receipt of the request, provide the COUNTY with a certified copy of each of the policies of insurance providing the coverage required by this Section.

(4) Neither approval by the COUNTY or failure to disapprove the insurance furnished by AUDITOR shall relieve the AUDITOR of the AUDITOR's full responsibility for performance of any obligation including AUDITOR's indemnification of COUNTY under this Agreement.

(b) Insurance Company Requirements. Insurance companies providing the insurance under this Agreement must meet the following requirements:

(1) Companies issuing policies other than Workers' Compensation must be authorized to conduct business in the State of Florida and prove same by maintaining Certificates of Authority issued to the companies by the Department of Insurance of the State of Florida.

Policies for Workers' Compensation may be issued by companies authorized as a group self-insurer by Section 440.57, Florida Statutes.

(2) In addition, such companies other than those authorized by Section 440.57, Florida Statutes, shall have and maintain a Best's Rating of "A" or better and a Financial Size Category of "VII" or better according to A.M. Best Company.

(3) If, during the period which an insurance company is providing the insurance coverage required by this Agreement, an insurance company shall: 1) lose its Certificate of Authority, 2) no longer comply with Section 440.57, Florida Statutes, or 3) fail to maintain the requisite Best's Rating and Financial Size Category, the AUDITOR shall, as soon as the AUDITOR has knowledge of any such circumstance, immediately notify the COUNTY and immediately replace the insurance coverage provided by the insurance company with a different insurance company meeting the requirements of this Agreement. Until such time as the AUDITOR has replaced the unacceptable insurer with an insurer acceptable to the COUNTY the AUDITOR shall be deemed to be in default of this Agreement.

(c) Specifications. Without limiting any of the other obligations or liability of the AUDITOR, the AUDITOR shall, at the AUDITOR's sole expense, procure, maintain and keep in force amounts and types of insurance conforming to the minimum requirements set forth in this Section. Except as otherwise specified in the Agreement, the insurance shall become effective prior to the commencement of work by the AUDITOR and shall be maintained in force until the Agreement completion date. The amounts and types of insurance shall conform to the following minimum requirements.

(1) Workers' Compensation/Employer's Liability.

(A) AUDITOR's insurance shall cover the AUDITOR for liability which would be covered by the latest edition of the standard Workers' Compensation Policy, as filed for use in Florida by the National Council on Compensation Insurance, without restrictive endorsements. The AUDITOR will also be responsible for procuring proper proof of coverage from its subcontractors of every tier for liability which is a result of a Workers' Compensation injury to the subcontractor's employees. The minimum required limits to be provided by both the AUDITOR and its subcontractors is outlined in subsection (c) below. In addition to coverage for the Florida Workers' Compensation Act, where appropriate, coverage is to be included for the United States Longshoremen and Harbor Workers' Compensation Act, Federal Employers' Liability Act and any other applicable Federal or State law.

(B) Subject to the restrictions of coverage found in the standard Workers' Compensation Policy, there shall be no maximum limit on the amount of coverage for liability imposed by the Florida Workers' Compensation Act, the United States Longshoremen's and Harbor Workers' Compensation Act, or any other coverage customarily insured under Part One of the standard Workers' Compensation Policy.

(C) The minimum amount of coverage under Part Two of the standard Workers' Compensation Policy shall be:

\$500,000.00	(Each Accident)
\$500,000.00	(Disease-Policy Limit)
\$500,000.00	(Disease-Each Employee)

(2) Commercial General Liability.

(A) The AUDITOR's insurance shall cover the AUDITOR for those sources of liability which would be covered by the latest edition of the standard Commercial General Liability Coverage Form (ISO Form CG 00 01), as filed for use in the State of Florida by the Insurance Services Office, without the attachment of restrictive

endorsements other than the elimination of Coverage C, Medical Payment and the elimination of coverage for Fire Damage Legal Liability.

(B) The minimum limits to be maintained by the AUDITOR (inclusive of any amounts provided by an Umbrella or Excess policy) shall be as follows:

LIMITS

General Aggregate	\$Three (3) Times the Each Occurrence Limit
Personal & Advertising Injury Limit	\$500,000.00
Each Occurrence Limit	\$500,000.00

(3) Professional Liability Insurance. The AUDITOR shall carry limits of not less than FIVE HUNDRED THOUSAND AND NO/100 DOLLARS (\$500,000.00).

(d) Coverage. The insurance provided by AUDITOR pursuant to this Agreement shall apply on a primary basis and any other insurance or self-insurance maintained by the COUNTY or the COUNTY's officials, officers, or employees shall be excess of and not contributing with the insurance provided by or on behalf of the AUDITOR.

(e) Occurrence Basis. The Workers' Compensation Policy and the Commercial General Liability required by this Agreement shall be provided on an occurrence rather than a claims-made basis. The Professional Liability insurance policy must either be on an occurrence basis, or, if a claims-made basis, the coverage must respond to all claims reported within three (3) years following the period for which coverage is required and which would have been covered had the coverage been on an occurrence basis.

(f) Obligations. Compliance with the foregoing insurance requirements shall not relieve the AUDITOR, its employees or agents of

liability from any obligation under a Section or any other portions of this Agreement.

SECTION 15. ALTERNATIVE DISPUTE RESOLUTION (ADR).

(a) In the event of a dispute related to any performance or payment obligation arising under this Agreement, the parties agree to exhaust COUNTY ADR procedures prior to filing suit or otherwise pursuing legal remedies. COUNTY ADR procedures for proper invoice and payment disputes are set forth in Section 55.1, "Prompt Payment Procedures," Seminole County Administrative Code. Contract claims include all controversies, except disputes addressed by the "Prompt Payment Procedures," arising under this Agreement and ADR procedures therefor are set forth in Section 220.102, "Contract Claims," Seminole County Code.

(b) AUDITOR agrees that it will file no suit or otherwise pursue legal remedies based on facts or evidentiary materials that were not presented for consideration in the COUNTY ADR procedures set forth in subsection (a) above of which the AUDITOR had knowledge and failed to present during the COUNTY ADR procedures.

(c) In the event that COUNTY ADR procedures are exhausted and a suit is filed or legal remedies are otherwise pursued, the parties shall exercise best efforts to resolve disputes through voluntary mediation. Mediator selection and the procedures to be employed in voluntary mediation shall be mutually acceptable to the parties. Costs of voluntary mediation shall be shared equally among the parties participating in the mediation.

SECTION 16. REPRESENTATIVE OF COUNTY AND AUDITOR.

(a) It is recognized that questions in the day-to-day conduct of performance pursuant to this Agreement will arise. The COUNTY, upon request by AUDITOR, shall designate in writing and shall advise AUDITOR

in writing of one (1) or more COUNTY employees to whom all communications pertaining to the day-to-day conduct of the Agreement shall be addressed. The designated representative shall have the authority to transmit instructions, receive information and interpret and define the COUNTY's policy and decisions pertinent to the work covered by this Agreement.

(b) AUDITOR shall, at all times during the normal work week, designate or appoint one or more representatives of AUDITOR who are authorized to act on behalf of AUDITOR regarding all matters involving the conduct of the performance pursuant to this Agreement and shall keep COUNTY continually advised of such designation.

SECTION 17. ALL PRIOR AGREEMENTS SUPERSEDED. This document incorporates and includes all prior negotiations, correspondence, conversations, agreements or understandings applicable to the matters contained herein and the parties agree that there are not commitments, agreements or understandings concerning the subject matter of this Agreement that are not contained or referred to in this document. Accordingly, it is agreed that no deviation from the terms hereof shall be predicated upon any prior representations or agreements, whether oral or written.

SECTION 18. MODIFICATIONS, AMENDMENTS OR ALTERATIONS. No modification, amendment or alteration in the terms or conditions contained herein shall be effective unless contained in a written document executed with the same formality and of equal dignity herewith.

SECTION 19. INDEPENDENT CONTRACTOR. It is agreed that nothing herein contained is intended or should be construed as in any manner creating or establishing a relationship of copartners between the parties, or as constituting the AUDITOR including its officers, employees, and agents, the agent, representative, or employee of the

COUNTY for any purpose, or in any manner, whatsoever. The AUDITOR is to be and shall remain an independent contractor with respect to all services performed under this Agreement.

SECTION 20. EMPLOYEE STATUS. Persons employed by the AUDITOR in the performance of services and functions pursuant to this Agreement shall have no claim to pension, workers' compensation, unemployment compensation, civil service or other employee rights or privileges granted to the COUNTY's officers and employees either by operation of law or by the COUNTY.

SECTION 22. SERVICES NOT PROVIDED FOR. No claim for services furnished by the AUDITOR not specifically provided for herein shall be honored by the COUNTY.

SECTION 23. PUBLIC RECORDS LAW. AUDITOR acknowledges COUNTY's obligations under Article 1, Section 24, Florida Constitution and Chapter 119, Florida Statutes, to release public records to members of the public upon request. AUDITOR acknowledges that COUNTY is required to comply with Article 1, Section 24, Florida Constitution and Chapter 119, Florida Statutes, in the handling of the materials created under this Agreement and that said statute controls over the terms of this Agreement.

SECTION 24. NOTICES. Whenever either party desires to give notice unto the other, it must be given by written notice, sent by certified United States mail, with return receipt requested, addressed to the party for whom it is intended at the place last specified and the place for giving of notice shall remain such until it shall have been changed by written notice in compliance with the provisions of this Section. For the present, the parties designate the following as the respective places for giving of notice, to wit:

FOR COUNTY:

Environmental Services Department
500 W. Lake Mary Boulevard
Sanford, Florida 32773

FOR AUDITOR:

SECTION 25. RIGHTS AT LAW RETAINED. The rights and remedies of the COUNTY, provided for under this Agreement, are in addition to any other rights and remedies provided by law.

SECTION 26. COMPLIANCE WITH LAWS AND REGULATIONS. In providing all services pursuant to this Agreement, the AUDITOR shall abide by all statutes, ordinances, rules, and regulations pertaining to, or regulating the provisions of, such services, including those now in effect and hereafter adopted. Any violation of said statutes, ordinances, rules, or regulations shall constitute a material breach of this Agreement, and shall entitle the COUNTY to terminate this Agreement immediately upon delivery of written notice of termination to the AUDITOR.

SECTION 27. CONFLICT OF INTEREST.

(a) The AUDITOR agrees that it will not engage in any action that would create a conflict of interest in the performance of its obligations pursuant to this Agreement with the COUNTY or which would violate or cause others to violate the provisions of Part III, Chapter 112, Florida Statutes, relating to ethics in government.

(b) The AUDITOR hereby certifies that no officer, agent or employee of the COUNTY has any material interest (as defined in Section 112.312(15), Florida Statutes, as over 5%) either directly or indirectly, in the business of the AUDITOR to be conducted here, and that no

such person shall have any such interest at any time during the term of this Agreement.

(c) Pursuant to Section 216.347, Florida Statutes, the AUDITOR hereby agrees that monies received from the COUNTY pursuant to this Agreement will not be used for the purpose of lobbying the Legislature or any other State or Federal Agency.

IN WITNESS WHEREOF, the parties hereto have made and executed this Agreement for the purposes stated herein.

ATTEST: _____

_____, Secretary By: _____, President

(CORPORATE SEAL) Date: _____

ATTEST: BOARD OF COUNTY COMMISSIONERS
SEMINOLE COUNTY, FLORIDA

MARYANNE MORSE By: _____
Clerk to the Board of DARYL G. MCLAIN, Chairman
County Commissioners of
Seminole County, Florida.

Date: _____

For the use and reliance
of Seminole County only.
Approved as to form and
legal sufficiency.

As authorized for execution by
the Board of County Commissioners
at their _____, 20____,
regular meeting.

County Attorney

AC/gn
2/17/03
RFP-4182-03/BJC Bid
Attachment:

Exhibit "A" - Scope of Services
Exhibit "B" - Rate Schedule

SCOPE OF WORK

1. Seminole County Environmental Services Department will supply names of water audit customers to the selected Service Provider. The Service Provider shall contact customers to schedule audits, including arrangements for access to the irrigation controller.
2. A primary focus of the irrigation audit shall be increasing the customer's awareness and familiarity with their irrigation system. Water use patterns following previous audits strongly suggested that increased awareness was an important factor in decreased water use. Educational time spent with the customer should be factored into the bid.
3. The Service Provider shall conduct irrigation audits to include the following activities:
 - Irrigation controller settings meet designated watering days
 - Irrigation timer set to apply IFAS recommended application of $\frac{1}{2}$ - $\frac{3}{4}$ inch per application to zones watering sod when watering twice a week
 - Measurement of flow rate from the meter box for each zone
 - Operating pressure of each zone
 - Correct functioning and spray pattern of each sprinkler head
 - Square footage for each zone
 - Water usage for each zone (inches/week)
 - Root depth of turfgrass– Rain sensor placement and operation
 - Capability and functioning of a battery backup for the irrigation controller
 - Other observations as needed to provide recommendations in Item 4
4. The Service Provider shall provide a written report and diagram of irrigation system to the customer and to the Seminole County Environmental Services, Water Conservation Program on audit results to include the following information:
 - Results from above measurements, including a diagram of property, irrigation zones, and sprinkler head locations.
 - Recommendations for controller adjustments to conform with designated watering days and application of recommended watering rates (IFAS rates).
 - Recommendations for sprinkler/irrigation system repair, maintenance, coverage, and appropriate match to vegetation, including but not limited to 1) shrubs and turf on different zones, 2) rotors and sprays on separate zones, and 3) nozzles in rotors have matched application rates.
 - Recommendations for irrigation system adjustments to improve coverage, minimize vegetation interference, and promote water conservation, ranging from simple repairs to renovations. Equipment needing repairs or maintenance should be identified on the irrigation diagram where appropriate
 - Recommendation for rain sensor addition, repair, replacement, or relocation as appropriate.
 - Recommendations to ensure controller battery backup functioning.
 - Where applicable, recommendations for alternative plant selections, landscape design, or irrigation methods to promote xeriscape principles (Please see examples).

- Other information or recommendations as appropriate (e.g. observation of plant diseases or pests)
5. Scope of work does not include Distribution Uniformity measurements.

Examples of Landscape Recommendations

1. Attend a landscaping seminar or workshop to learn more about caring for your yard in an environmentally friendly way.
2. Follow the watering restrictions. A little known fact is that the watering restrictions are set at the recommended watering rate for turfgrass based on research by the University of Florida (two times per week, $\frac{3}{4}$ inch of water each time). Except in severe drought, your lawn doesn't need any more water than this.
3. Whenever you are planning new landscaping, expand your beds. Mulched areas with shrubs and trees require little or no supplemental water once they become established.
4. For zones that only water shrubs and other plants with low water requirements, gradually decrease watering frequency. As these plants adjust, water only as needed.
5. Replace beds of annual flowers with shrubs. There are a number of attractive flowering shrubs or other plants with low water requirements available.
6. In shade areas, replace lawn with shade-tolerant groundcover species that use less water. St Augustine grass usually doesn't do well in shade.
7. Remove turfgrass from areas with poor sprinkler coverage and replace with shrubs and trees in mulched beds that need little or no supplemental water once established.
8. In zones that primarily water shrubs, expand beds to eliminate lawn in those zones. Once new bed plants are established, gradually decrease watering frequency for that zone.

- Other information or recommendations as appropriate (e.g. observation of plant diseases or pests)
5. Scope of work does not include Distribution Uniformity measurements.
 6. Sub-contractors shall not be utilized for this contract.

Examples of Landscape Recommendations

1. Attend a landscaping seminar or workshop to learn more about caring for your yard in an environmentally friendly way.
2. Follow the watering restrictions. A little known fact is that the watering restrictions are set at the recommended watering rate for turfgrass based on research by the University of Florida (two times per week, ¾ inch of water each time). Except in severe drought, your lawn doesn't need any more water than this.
3. Whenever you are planning new landscaping, expand your beds. Mulched areas with shrubs and trees require little or no supplemental water once they become established.
4. For zones that only water shrubs and other plants with low water requirements, gradually decrease watering frequency. As these plants adjust, water only as needed.
5. Replace beds of annual flowers with shrubs. There are a number of attractive flowering shrubs or other plants with low water requirements available.
6. In shade areas, replace lawn with shade-tolerant groundcover species that use less water. St Augustine grass usually doesn't do well in shade.
7. Remove turfgrass from areas with poor sprinkler coverage and replace with shrubs and trees in mulched beds that need little or no supplemental water once established.
8. In zones that primarily water shrubs, expand beds to eliminate lawn in those zones. Once new bed plants are established, gradually decrease watering frequency for that zone.

\$7.⁰⁰
25

SUBMIT PROPOSALS TO: Seminole County 1101 E. 1st Street, Room 3208 Sanford, Florida 32771 Attn.: PURCHASING DIVISION		REQUEST FOR PROPOSALS and Proposer Acknowledgment	
Contact: Betsy J. Cohen, CPPB 407-665-7112 bcohen@co.seminole.fl.us		RFP No.: RFP-4182-03/BJC Irrigation Audits Services	
Proposal Due Date: March 19, 2003 Proposal Due Time: 2:00 P.M.		Location of Public Opening: County Services Building, Room #3208 1101 E. 1st Street, Sanford, Florida 32771	
Proposer Name: <i>Masuen Consulting</i>		Federal Employer ID Number or SS Number: <i>65-0964724</i>	
Mailing Address: <i>32801 US Hwy 441 N.</i> <i>#207</i> <i>Okeechobee, FL 34972</i>		If returning as a "No Submittal", state reason (if so, return only this page):	
City, State, Zip:			
Type of Entity: (Circle one) Corporation <u>Partnership</u> Proprietorship Joint Venture		X <i>M Masuen</i> Authorized Signature (Manual)	
Incorporated in the State of:			
Telephone Number: <i>863/467-4115</i>		Typed Name: <i>Michele Masuen</i>	
Toll Free Telephone Number: (800)		Title: <i>partner</i>	
Fax Number: <i>863-763-9196</i>		Date: <i>3-18-03</i>	

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR PROPOSAL

Purpose:

It is the intent of Seminole County, Environmental Services Department to secure a qualified Provider for the purpose of awarding a contract to conduct irrigation audits for residential properties. The successful Proposer shall provide the necessary background knowledge, organizational skills, communication skills and equipment to conduct and report results from irrigation audits or other irrigation-related projects. The successful Proposer shall demonstrate staffing capacity to dedicate one or more staff to this contract.

RFP-4182-03/BJC

PROPOSAL FOR IRRIGATION AUDITING SERVICES

by

MASUEN CONSULTING

March 19, 2003

SECTION ONE
REQUIRED SUBMITTALS

Letter of Transmittal

March 19, 2003

To: Seminole County Purchasing and Contracts Division
1101 East First Street, Room 3208
Sanford, FL 32771

From: Masuen Consulting
32801 US Hwy 441 North #207
Okeechobee, FL 34972

RE: RFP-4182-03/BJC
IRRIGATION AUDITING SERVICES

MASUEN CONSULTING understands all terms and conditions of the RFP-4182-03/BJC. It further acknowledges the COUNTY'S obligations under the **Public Records Law** under Article 1, Section 24, Florida Constitution and Chapter 119, Florida Statutes.

Corporate Information: MASUEN CONSULTING is a partnership in the State of Florida.

Summary of Litigation: None

License Sanctions: None

Acknowledgement of Addenda: None

Conflict of Interest Statement: see attached

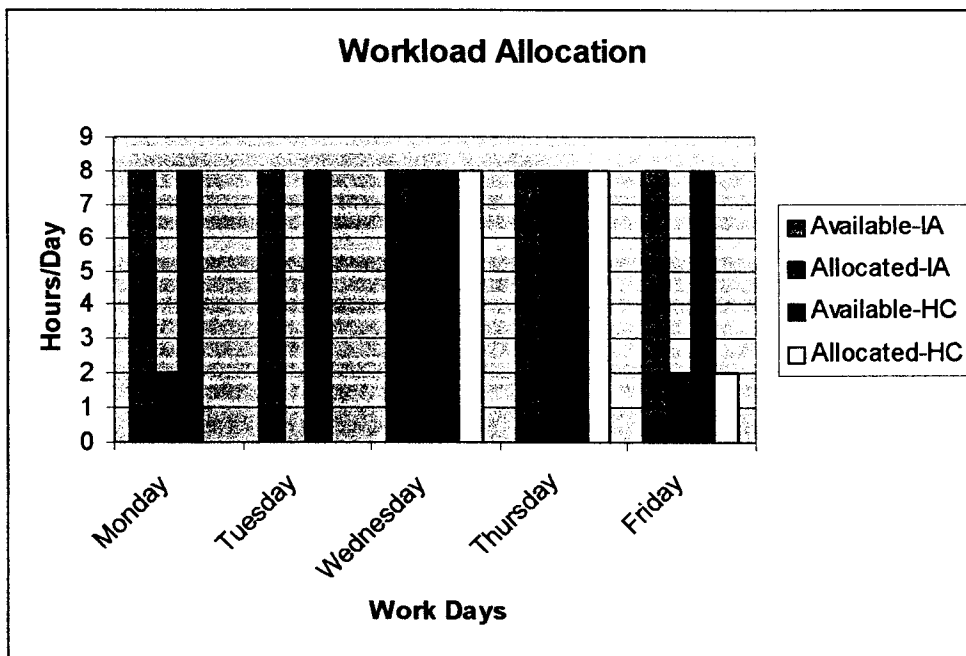
Current Workload: see page three

Signed: M Masuen
Partner, Masuen Consulting

Current Workload

Masuen Consulting has three major divisions: (1) Irrigation Design/Consulting, (2) Horticultural Consulting, and (3) Water Audits. For this RFP, Irrigation Auditing Services, only the Horticultural Consulting and Water Audit divisions would be impacted. On staff there is one Horticultural Consultant/Landscape Irrigation Auditor and two Landscape Irrigation Auditors.

For the services requested a Horticultural Consultant (HC) and a Landscape Irrigation Auditor (IA) would be assigned to work as a team. This team would commit to two – three days per week for the duration of the contract. See the chart below for a prototypical workload allocation per week.



This chart is based on the assumption that the Irrigation Auditor would make appointments for irrigation audits on Monday. Wednesday and Thursday would be allocated to the team working in the field doing the actual irrigation audits. The time on Friday would be for office time to print out reports for Seminole County, up date client database, etc.

**Section 4
Conflict Of Interest Statement**

STATE OF FLORIDA)
) ss
COUNTY OF Okeechobee)

Before me, the undersigned authority, personally appeared _____, who was duly sworn, deposes, and states:
1. I am the partner of Masuen Consulting with a local office in Okeechobee and principal office in Okeechobee.

2. The above named entity is submitting an Expression of Interest for the Seminole County project described as: RFP-4182-03/BJC - Irrigation Audits

3. The Affiant has made diligent inquiry and provides the information contained in this Affidavit based upon his own knowledge.

4. The Affiant states that only one submittal for the above project is being submitted and that the above named entity has no financial interest in other entities submitting proposals for the same project.

5. Neither the Affiant nor the above named entity has directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive pricing in connection with the entity's submittal for the above project. This statement restricts the discussion of pricing data until the completion of negotiations and execution of the Agreement for this project.

6. Neither the entity nor its affiliates, nor any one associated with them, is presently suspended or otherwise ineligible from participating in contract lettings by any local, state, or federal agency.

7. Neither the entity, nor its affiliates, nor any one associated with them have any potential conflict of interest due to any other clients, contracts, or property interests for this project.

8. I certify that no member of the entity's ownership, management, or staff has a vested interest in any aspect of or Department of Seminole County.

9. I certify that no member of the entity's ownership or management is presently applying for an employee position or actively seeking an elected position with Seminole County.

10. In the event that a conflict of interest is identified in the provision of services, I, on behalf of the above named entity, will immediately notify Seminole County in writing.

DATED this 18th day of March, 2003

(Affiant)

Michele Masuen
Typed Name of Affiant

partner
Title

Sworn to and subscribed before me this 18 day of March, 2003.

Personally known ☒

OR Produced identification _____ Notary Public - State of FLORIDA

My commission expires 12/07/04

(Type of Identification)

notary public)

JOHN W. LYNCH
NOTARY PUBLIC STATE OF FLORIDA
COMMISSION # CC988433
EXPIRES 12/27/2004
BONDED THRU 1-888-NOTARY1

John W. Lynch
(Printed typed or stamped commissioned name of

THIS FORM MUST BE COMPLETED AND RETURNED WITH YOUR PROPOSAL

SECTION TWO
QUALIFICATIONS

2. Qualifications

- A. Masuen Consulting has been doing business in Florida since 1995. Our office is located in Okeechobee County. This is a full service landscape consulting firm providing irrigation design, irrigation consulting and project management, horticultural consulting, water use and management consulting, and irrigation audits. For the past two years we have provided irrigation consulting services to Lake County in a similar project called the 'Sensible Sprinkling Program'. This contract was for irrigation audits of commercial, residential and golf course properties.
- B. The Horticulture Consultant, Michele Masuen, is a Certified Master Gardener. A copy of the certificate is enclosed. She has a B.S. in Agriculture and has completed the coursework for her M.A. in Environmental Education.
- C. The lead Irrigation Consultant/Designer is certified with the Irrigation Association as a Commercial Irrigation Designer, Golf Course Designer, Irrigation Contractor, Landscape Irrigation Auditor, and Golf Course Irrigation Auditor (see enclosed certificates).
- D. Currently we have four staff members; all of which are Certified Landscape Irrigation Auditors. Enclosed is the supporting documentation.
- E. References
 - 1) A. Lake County Water Authority has contracted with Masuen Consulting for the past two years to provide irrigation audits for their 'Sensible Sprinkling Evaluation Program'. The first year focused on commercial and residential landscape irrigation audits. The second year focused on commercial and golf course landscape irrigation audits, developing sample Landscape and Irrigation ordinances, and an Irrigation Contractor Licensing ordinance. The property owner's contacted were referred to Masuen Consulting by the Lake County Water Authority.

During the year 2001 Masuen Consulting conducted 127 residential and 11 commercial irrigation audits for a total of 1065 zones. Most of the commercial irrigation audits were of common areas in subdivisions.

The year 2002 had only six property owners participating but they consisted of the City of Tavares Public Works (16 buildings), Lake Sumter College (10 buildings), and four housing developments. In addition 14 golf courses were audited. The total audits for 2002 were 919 irrigation zones.

Various participants have contacted our office to ask for further assistance in implementing the recommendations in their report. Due to the cost associated with implementing changes to the irrigation system most respondents are making the changes as the budget allows, or as they are replacing broken parts, and stressed or dying plant material.

For information regarding this contract you may contact:

Lake County Water Authority
Attn: Patricia Burgos
107 North Lake Ave.
Tavares, FL 32778-3119
352/343-3777 ext. 30
352/343-4259 (fax)

B. Hunters Creek Community Association contracted with Masuen Consulting to provide a landscape irrigation audit for their Vista irrigation system. The intent of this audit was to verify the design and installation of this system met the contractual obligations of the installation contractor. Based on their report this community has implemented the recommendations and implemented the watering schedules that allow the entire site to be watered within the watering window.

For information regarding this contract you may contact:

Hunters Creek Community Association
Attn: Tom St. Peter
5100 Town Center Blvd.
Orlando, FL 32837
407/240-0162
407/240-0183 (fax)

- (2) Enclosed are two previous irrigation audits: one for Lake County Water Authority and one for the Hunters Creek project referenced above.

The audit for Lake County Water Authority was for a residence. The format of this report was a combined effort on the part of the Lake County Water Authority, St. Johns River Water Management District and Masuen Consulting. The purpose of this report was to be easily read and understood by the average person to promote water conservation awareness in the client.

The Hunters Creek Community Association report was tailored to the particular needs of the client. The intent of this audit was to verify the design and installation of the irrigation system was per the installation contract, and that it was capable of irrigating the site in an efficient and water-conserving manner. A water schedule for that irrigation system was provided.

- (3) Masuen Consulting has four staff members – all of whom are Certified Irrigation Auditors. It is anticipated that two of our staff, one Horticulture Consultant and one Irrigation Auditor, will be assigned permanently to this contract to work as a team. Working full-time two days a week, these two staff members should be able to audit, on average, four residences per day. Two other days will have time allotted for setting up appointments and doing paperwork related to this contract. With this time allotment it would take approximately 25 weeks to conduct 200 audits. Based on the needs of Seminole County the work assignment would be adjusted to meet their timetable.
- (4) The principles of Masuen Consulting have been involved in, and committed to, water conservation for over 16 years. This is exemplified in their irrigation designs, involvement in public education, legislation implementation, and the basic core values of the company itself. Masuen Consulting practices what they preach at the highest levels of its profession. It only contracts with clients who are willing to hear their message and share their commitment to the safeguarding and conserving of our precious water resources.
- (5) Xeriscape principles such as irrigating shrubs separately from sod and hydrozoning irrigation zones are implemented in Masuen Consulting's irrigation designs. Our irrigation designer is certified by the Irrigation Association and has worked as an irrigation contractor installing irrigation systems.

Our Horticulture Consultant is a big proponent of 'Right Plant, Right Place' and is knowledgeable about Florida native plants, as well as the common ornamental landscape plants, and their requirements. She has given seminars on xeriscaping to Master Gardener's, cities, and other groups.
- (6) The Irrigation Auditors have field experience installing irrigation systems, and setting irrigation controllers and rain sensors. One of our Irrigation Auditors is a Certified Irrigation Contractor.

F. Response Time

- 1) The Irrigation Auditor will contact customer(s) and schedule appointments on Mondays and Fridays of each week upon receiving name(s) from the County. In order to maximize their effectiveness, they will group appointments by area/address.

- 2) Written reports will be submitted to the customer at the time of the irrigation audit. These reports will be submitted to Seminole County on a weekly basis.



Masuen
Consulting

Masuen Consulting

Water-wise specialist creating environments for the future.

Year Founded – 1995

Business Entity – Partnership

Owners – Michele Masuen
Mitchel Walker

Total Owner Experience in Field – Over 30 years

Primary Business:

- Landscape Irrigation Design and Consulting
- Horticultural Consulting
- Water Audits

Design Software Used:

- AutoCAD versions 14 and 2000i
- Micro Station version J

Other Software Utilized:

Microsoft Office Professional

Office Capabilities:

- Printing in most sizes and formats
- 8.5" X 11" to 36" X 48"
 - Black and White to full photo quality color
- Photography – Both 35mm and digital

Project Types:

- Large commercial and industrial
- Government projects (i.e. parks, roadways, government buildings, etc.)
- Golf Courses
- Large-scale residential projects
- Specialty – (i.e. resorts, family entertainment centers, etc.)

Water-wise specialist creating environments for the future.

The title of
FLORIDA MASTER GARDENER

is conferred on

Michelle Mause

by the Florida Cooperative Extension Service /

Institute of Food and Agricultural Sciences / University of Florida.

This award is granted May 29, 1996 upon the successful completion
of a prescribed course in gardening and plant problem solving.



Mary L. Schneider
Extension Agent



THE IRRIGATION ASSOCIATION

12

Certifies That On
October 24, 2002

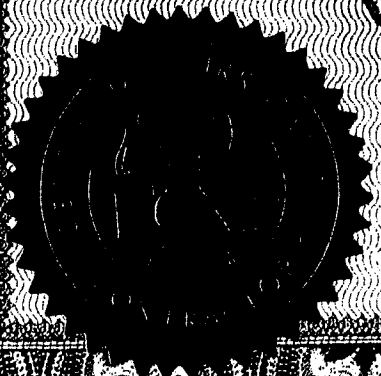
Michael A. Walker

Candidate ID 002296

Successfully Completed All Necessary Requirements
And Shown Proficiency In The Field

CERTIFIED IRRIGATION CONTRACTOR


Chair, Certification Board



THE IRRIGATION ASSOCIATION

Certifies that

on

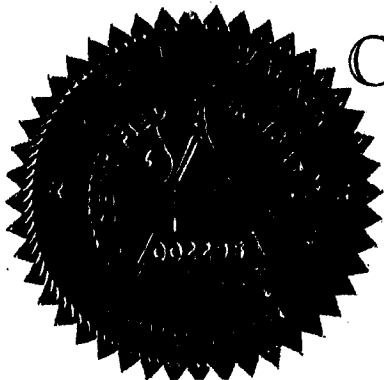
August 1, 1996

Mitchel A. Walker

*Successfully Completed
All The Necessary Requirements*

*And Should Henceforth Be
Recognized As A Certified*

COMMERCIAL IRRIGATION DESIGNER



JM Barnett
Chairman, Certification Board

THE IRRIGATION ASSOCIATION

25

Certifies That On
September 25, 2000

MITCHELL A. WALKER

Successfully Completed All Requirements
And Should Be Recognized As A

**CERTIFIED GOLF COURSE
IRRIGATION DESIGNER**

Chair, Certification Board



THE IRRIGATION ASSOCIATION

Certifies That On
July 8, 2002

R. Sterling Crosby

Successfully Completed All the Necessary Requirements
And Shown Proficiency in the Field As

CERTIFIED IRRIGATION DESIGNER - COMMERCIAL

[Signature]
Chair, Certification Board

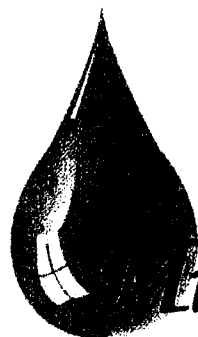


THE IRRIGATION ASSOCIATION

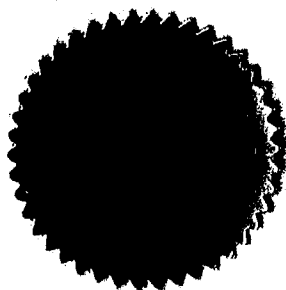
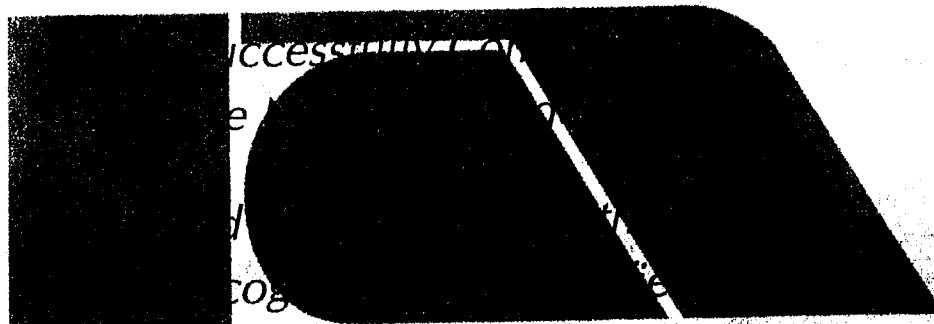
Certifies that

on

July 16, 1993



Mitchel Walker



LANDSCAPE IRRIGATION AUDITOR

Ronald E. Ince
Chairman, Certification Board

THE IRRIGATION ASSOCIATION

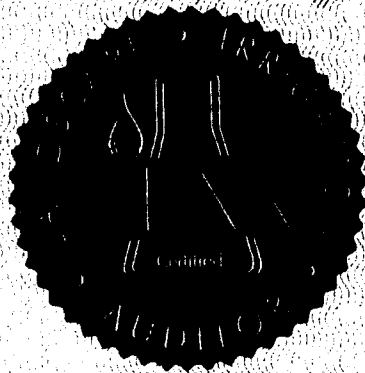
25

Certifies That On
November 4, 2001

Michael C. Walker

Successfully Completed All The Necessary Requirements
And Should Henceforth Be Recognized As A

**CERTIFIED LANDSCAPE
IRRIGATION AUDITOR**



Glen S. Moore

Chair, Certification Board

THE IRRIGATION ASSOCIATION

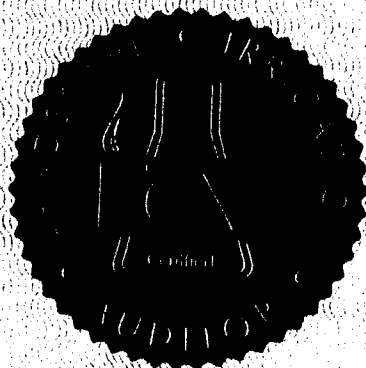
25

Certifies That On
November 4, 2001

Michele Masuen

Successfully Completed All The Necessary Requirements
And Should Henceforth Be Recognized As A

**CERTIFIED LANDSCAPE
IRRIGATION AUDITOR**



Glenn S. Moore
Chair, Certification Board

THE IRRIGATION ASSOCIATION

25

Certifies That On
October 24, 2002

R. Sterling Crosby

Candidate ID Number: 42455

Successfully Completed All The Necessary Requirements
And Should Henceforth Be Recognized As A

**CERTIFIED LANDSCAPE
IRRIGATION AUDITOR**



Joseph H. Foster
Chair, Certification Board

SPRINKLER SYSTEM EVALUATION

For: James Residence
1981 Park Forest Blvd. Mt. Dora, FL

Evaluation Date: December, 2001

Rain Sensor: YES

Note: Items in the Irrigation and Landscape sections that are in bold type indicate these are problems seen at your site.

General Information - Irrigation:

A. The following is a list of common problems, which can result in poor irrigation system performance, and excessive use of water:

1. **Poor irrigation design**
 - a. **poor head spacing**
 - b. improper pipe sizing and layout
 - c. **non-matched precipitation rates**
 - d. **turf and shrubs mixed together on the same irrigation zone**
 - e. mixed zones with sprays and rotors
 - f. mixed heads on same zone – different manufacturers products
2. **Poor maintenance**
 - a. **Tilted, sunken, and/or clogged sprinkler heads**
 - b. Replacing heads and/or nozzles with different types than original design
 - c. **Head no longer sprays over the turf, shrubs, etc. due to growth**
 - d. Missing, cracked, or broken heads
 - e. Valves do not activate from controller
3. **No pressure regulation at the sprinkler head or the remote control valve.**
In general for urban landscape applications, spray heads operate best at 30 PSI and rotor heads operate best at 50-70 PSI depending on application.
4. **No check valves in sprinkler heads where there are elevation changes.**
5. **Nozzle is blocked from covering it's entire coverage area**
 - a. **four inch pop-ups in St. Augustine turf**
 - b. **risers which are too low – do not throw over but throw into plant material**
 - c. **four or six inch pop-ups in annual and groundcover beds**

B. To correct these problems:

1. Have a qualified irrigation designer design a new layout for the system.
 - c. As nozzles are replaced, standardize the type of nozzle used (i.e. Hunter, Rain Bird, etc.)
 - d. Separate turf and shrubs/planting beds into separate irrigation zones.
 - e. Separate zones into all spray and all rotor zones.
 - f. As heads are replace, standardize the type of sprinkler head used.
2. See "Recommended Irrigation Maintenance Checklist" enclosed.
3. Install heads with pressure regulator or add pressure regulator to control valve.
4. Install check valves in heads at low points in the landscape to prevent low head drainage.

5. Use 6" pop-ups in turf, 12" pop-ups in ground cover/planting beds, and in shrub beds use pop-up heads on risers. Insure each head is able to adequately cover its entire coverage area without any distortion/interference of the arc.

General Information - Landscape:

A. The following is a list of common problems, which can result in an unhealthy, non-thriving landscape. This can lead to excessive use of water, weed invasion, pest invasion, unsightly appearance, increased plant mortality, shortened life of plant material, and an increase in pesticide, herbicide, and fertilizer use.

1. **Plants scattered throughout lawn area.**
2. **Shrubs being watered with turf areas**
3. **St. Augustine sod is a high water consumer**
4. High water use plants in dry landscape conditions.
5. Using plants that are not adapted to your *hardiness zone*.
6. Insufficient mulch in planting beds.
7. Beds or turf areas which are not easily irrigated (i.e. - 2' strip of turf)

B. To correct these problems:

1. Group plants together in large beds.
2. Turf areas should be irrigated separate from shrubs/planting beds.
3. Convert St. Augustine to Bahiagrass when possible in dry landscapes.
 - a. Use ground covers and shrubs with small areas of turfgrass.
 - b. Use turf where it has practical use such as play areas or erosion control.
4. Use plants, which are rated as low-water use or drought-tolerant.
 - a. Match plants to conditions: moisture loving plants in moist to wet areas, and plants that need dry conditions in dry areas.
5. Determine which plants will succeed in your area by locating which *hardiness zone* you live in. (Lake Co. ranges from 9, 9A to 9B)
6. Mulch 2-3" deep. Keep mulch 2-3" from stems and trunks of plants. Mulch prevents loss of water by evaporation and suppresses weeds.
7. The size of turf and shrub areas should account for limitations in the irrigation system.

Managing Your Florida Lawn

1. Proper mowing practices – height and frequency of cut
 - a. St. Augustine (Floritam) – cut to 3" - 4"; remove no more than 1/3 the height of the grass blade.
 - b. Bahiagrass – cut to 3"-4" every 7-14 days
2. Physical and environmental limitations
 - a. Is the area easily mowed?
 - b. Shade tolerance?
 - c. Drought tolerance? Bahiagrass has excellent drought tolerance.
 - d. Soil type? Sand, clay, or marl.

Sensible Sprinkling Evaluation Results for Your Site:

Soil Type: Sandy

Root Depth: 7 1/2" avg.

- Set rain sensor to 1/8" for all months except June, July, and August. During June, July, and August, set the rain sensor at 1/4".
- Adjust leaning heads to upright position for correct spray pattern.
- Zone 4 clogged nozzle by a/c unit – clean out nozzle

DISTRIBUTION UNIFORMITY & PRECIPITATION RATE CHART

- **Precipitation rate** is the average amount of water delivered to the landscape during a given amount of time. It is given in inches per hour.
- **Distribution uniformity** is a measure of the uniformity of water applied within an irrigation zone. It is given as a decimal. Multiply the number by 100 to get the percentage.

Controller-Zone # -Type	Precipitation Rate (inches-hr)	Distribution Uniformity
1-rotor	.32	.14
2-spray	.64	.30
3-spray	.88	.38
4-spray	1.01	.34
5-rotor	.32	.45
6-spray	1.06	.52

Note: These figures reflect the information gathered by the system evaluation.

How To Use This Chart

1. Precipitation rates for rotors should be lower than for spray heads. Normal precipitation rates are as follows:
 - a. rotors - .25 to 1.0
 - b. sprays – 1.5 to 2.5

Distribution Uniformity's values are described as follows:

- a. .90 and above – excellent
- b. .70 to .89 – good
- c. .60 to .69 – fair
- d. .50 to .59 – poor
- e. below .50 – hard to manage effectively

Note: It is common to see Distribution Uniformity's below .50 in Florida. This trend needs to change if we are going to manage our water more responsibly. End users need to start demanding their irrigation systems be installed and maintained to uniformity's of .50 or higher (the higher the better).

Low Precipitation rates can be due to:

- A site with heavy clay soils will require an unusually low precipitation rate
- Poor system design
- Poor system maintenance

Low Distribution Uniformity is due to the following possible reasons:

- improper head spacing
- no matched precipitation rates between a zone
- clogged heads
- incorrectly adjusted heads (improper alignment and arc adjustment)
- improper pipe sizing and layout
- improper valve sizing

IRRIGATION SCHEDULE - Example

Based on Proper Design and Maintenance

- **Start Time** is the number of cycles a zone is programmed to run per water day.
- **Run Time** is the amount of time at zone should run per start time.
- **Water Days** is the number of days per week/ month, the irrigation system should be scheduled to run.

Zone /Type	Plant Type	Dec-Jan-Feb			March-Nov			April-May-Sept-Oct			June-July Aug		
		Start time	Run Time	Water Days	Start time	Run Time	Water Days	Start time	Run Time	Water Days	Start time	Run Time	Water Days
Rotor	Turf	1/day	19 min	1/mo.	1/day	31 min	1/week	1/day	22 min	2/week	1/day	27 min	2/week
Rotor	Shrubs	None	None	none	1/day	27 min	1/week	1/day	30 min	1/week	2/day	25 min	1/week
Spray	Turf	1/day	21 min	1/mo	1/day	15 min	1/week	1/day	15 min	2/week	1/day	15 min	2/week
Spray	Shrubs	None	None	none	1/day	18 min	2/mo	1/day	16 min	1/week	2/day	14 min	1/week

- This schedule was based on an irrigation system that had a precipitation rate of 1.0, a DU of .80 for rotor zones, and sandy soil. For the spray zones the precipitation rate was 2.0, the DU was .7 and sandy soil.
- This schedule assumes your site receives the 'fifty year' average of rainfall during each week. If rainfall is more, or less, than normal these schedules would need to be changed.

Recommended Resources

Florida Lawn Handbook – Kathleen Ruppert & Robert Black

Your Florida Landscape – Dr. Robert Black and Dr. Kathleen Rupert

These books are published by the University of Florida and can be ordered at your local Agriculture Extension Office or through their web site at: www.edis.ifas.ufl.edu

WaterWise Florida Landscape Guide, Florida's Water management Districts 1-800-RALLY-22

Florida yards & Neighborhoods Landscape Workshops – call for workshop dates

Lake County Water Authority (353) 343-3777 x 30

Lake County Extension Office (352) 343-4101 – Teresa Watkins

September 11, 2000

Hunters Creek
5100 Town Center Blvd.
Orlando, FL 32837

Re: Hunter Vista Irrigation System Evaluation

Dear Mr. Rasnic,

Enclosed are the observations, conclusions, and recommendations of Masuen Consulting based on our on-site system audit, a review of the original irrigation plans and as-builts, and conversations with Gary Price.

Some industry terminology is used to describe our observations. Please refer to the enclosed terminology sheet for explanations. We have also enclosed a proposed Schedule for each zone and a 'Scheduling' information sheet for use by your in-field personnel to help them better understand how the following information was used to develop these irrigation schedules.

Feel free to call and discuss any issues/concerns, etc. you may have.

Sincerely,

Mitchel A. Walker, A.S.I.C

cc. Gary Price
Tom St. Peter

HUNTER CREEK IRRIGATION EVALUATION

OBSERVATIONS:

General

1. Irrigation System is a typical 'block and valve' system
2. Water supply is a 4" well
3. P.O.C. is a 7.5 h.p., pressure demand, submersible 'Flo-Boy' pump station by P.S.I. – Flowtronix
4. Pump station design parameters are 90 g.p.m. at 225 T.D.H.
5. Pump set is 60' with dynamic water level at 50'
6. Pump discharge pressure (downstream of control valve) range is 48 to 54 p.s.i.
7. Valves are Toro 252 series
8. Rotors are Hunter PGP
9. Spray heads are Toro 570 series
10. Mainline is class 200 PVC with Harco Ductile Iron fittings
11. Lateral lines are class 200 and class 160
12. Controllers are Rain Bird ESP-32-SAT
13. Flow meter is Data Industrial Brass insert type with Data Industrial model 1500 pulse transmitter
14. Flow meter installed 28" downstream and 8" upstream of closest fittings
15. Rain sensor is a Mini-Click 502 series
16. Head spacing highly variable-majority of zones have adequate spacing but a few have poor spacing
17. Large pressure variations between zones – most are under pressurized
18. Many zones contain risers and/or pop-up spray heads that are too low
19. Some zones have improper nozzling – mainly on rotor zones but also seen on some spray zones
20. A few zones have mixed head types – contributes to poor uniformity
21. Pipe sizing of mainlines appears adequate – Lateral lines appear to have been sized using 5 f.p.s. as only criteria. Friction factor pipe sizing is the correct method. This could be part of the reason for the widely variable pressure differences between and within zones.
22. Considerable variation was seen in root zone depth. In almost all cases, the root zone depth was controlled by a compacted layer of clay soil lying below the top layer of sand. This layer of clay varied from about 6" to 24" and deeper.

Controller A**Station 1**

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Mixed
3. Flow rate – 75 g.p.m.
4. 'At head' pressure ranges – 17 p.s.i. to 30 p.s.i.
5. Average root zone depth – 7"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.22 in./hr.
8. Distribution Uniformity (D.U.) - .49
9. Low pressure at some heads
10. Damaged/broken/malfunctioning heads

Station 2

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Mixed
3. Flow rate – 50 g.p.m.
4. 'At head' pressure ranges – 15 p.s.i. to 26 p.s.i.
5. Average root zone depth – 9.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.16 in./hr.
8. Distribution Uniformity (D.U.) – .51
9. Low pressure

Station 3

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Mixed
3. Flow rate – 78 g.p.m.
4. 'At head' pressure ranges – 17 p.s.i. to 18 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.01 in./hr.
8. Distribution Uniformity (D.U.) - .33
9. Low pressure
10. Plugged nozzles
11. Missing/broken heads

Station 4

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 73 g.p.m.
4. 'At head' pressure ranges – 24 p.s.i. to 29 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .95 in./hr.
8. Distribution Uniformity (D.U.) - .09
9. Low pressure

Station 5

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Mixed
3. Flow rate – 58 g.p.m.
4. 'At head' pressure ranges – 12 p.s.i. to 18 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .77 in./hr.
8. Distribution Uniformity (D.U.) - .20
9. Low pressure
10. Damaged/broken/malfunctioning heads
11. Misaligned heads

Station 6*

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 75 g.p.m.
4. 'At head' pressure ranges – 12 p.s.i. to 14 p.s.i.
5. Average root zone depth – 8.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – in./hr. **(UN-AUDITABLE)**
8. Distribution Uniformity (D.U.) - % **(UN-AUDITABLE)**
9. Low pressure
10. Damaged/broken/malfunctioning heads

Station 7

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 65 g.p.m.
4. 'At head' pressure ranges – 20 p.s.i. to 28 p.s.i.
5. Average root zone depth – 6.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .91 in./hr.
8. Distribution Uniformity (D.U.) - .34
9. Misaligned heads
10. Clogged heads
11. Low pressure

Station 8**NOT AUDITED – BUBBLER ZONE**Station 9

1. Application Technology - Pop-up rotors
2. Plant type(s) - Mixed
3. Flow rate – 73 g.p.m.
4. 'At head' pressure ranges – 30 p.s.i. to 35 p.s.i.
5. Average root zone depth – 6"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .22 in./hr.
8. Distribution Uniformity (D.U.) - .44
9. Low pressure

Station 10**NOT AUDITED – BUBBLER ZONE**Station 11**NOT AUDITED – BUBBLER ZONE**

Station 12

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 66 g.p.m.
4. 'At head' pressure ranges – 30 p.s.i. to 33 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .87 in./hr.
8. Distribution Uniformity (D.U.) - .20

Station 13

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 63 g.p.m.
4. 'At head' pressure ranges – 12 p.s.i. to 40 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .63 in./hr.
8. Distribution Uniformity (D.U.) - .42
9. Low pressure at some heads

Station 14

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 45 g.p.m.
4. 'At head' pressure ranges – 10 p.s.i. to 35 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.16 in./hr.
8. Distribution Uniformity (D.U.) - .45
9. Low pressure at some heads

Station 15

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Shrubs
3. Flow rate – 72 g.p.m.
4. 'At head' pressure ranges – 10 p.s.i. to 20 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.35 in./hr.
8. Distribution Uniformity (D.U.) - .19
9. Low pressure
10. Broken or missing heads

Station 16

1. Application Technology - Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 52 g.p.m.
4. 'At head' pressure ranges – 8 p.s.i. to 26 p.s.i.
5. Average root zone depth – 5.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .70 in./hr.
8. Distribution Uniformity (D.U.) - .26
9. Low pressure

Station 17

1. Application Technology - Pop-up spray heads
2. Plant type(s) – Mixed: turf, shrubs, trees
3. Flow rate – 72 g.p.m.
4. 'At head' pressure ranges – 10 p.s.i. to 15 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.07 in./hr.
8. Distribution Uniformity (D.U.) - .21
9. Low pressure

Station 18

1. Application Technology - Pop-up spray heads
2. Plant type(s) – Mixed: turf & shrubs
3. Flow rate – 49 g.p.m.
4. 'At head' pressure ranges – 22 p.s.i. to 30 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .89 in./hr.
8. Distribution Uniformity (D.U.) - .42
9. Low pressure at some heads

Station 19

NOT AUDITED – not a functioning zone

Station 20

NOT AUDITED - not a functioning zone

Station 21

NOT AUDITED - not a functioning zone

Station 22

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 18 g.p.m.
4. 'At head' pressure ranges – 37 p.s.i. to 42 p.s.i.
5. Average root zone depth – 4.5"
6. Soil type – loam
7. Precipitation rate (P.R.) – .25 in./hr.
8. Distribution Uniformity (D.U.) - .69
9. Low pressure at some heads
10. Arc misalignment

Station 23

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 60 g.p.m.
4. 'At head' pressure ranges – 50 p.s.i. to 52 p.s.i.
5. Average root zone depth – 9"
6. Soil type – sandy-loam
7. Precipitation rate (P.R.) – .77 in./hr.
8. Distribution Uniformity (D.U.) - .12

Station 24

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Mixed: turf & shrubs
3. Flow rate – 19 g.p.m.
4. 'At head' pressure ranges – 28 p.s.i. to 31 p.s.i.
5. Average root zone depth – 10"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.05 in./hr.
8. Distribution Uniformity (D.U.) - .41
9. Low pressure at some heads

Station 25

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Turf & trees
3. Flow rate – 52 g.p.m.
4. 'At head' pressure ranges – 43 p.s.i. to 47 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .28 in./hr.
8. Distribution Uniformity (D.U.) - .61

Station 26*

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 60 g.p.m.
4. 'At head' pressure ranges – 11 p.s.i. to 20 p.s.i.
5. Average root zone depth – 7"
6. Soil type – sand
7. Precipitation rate (P.R.) – in./hr. (**Un-auditable**)
8. Distribution Uniformity (D.U.) - % (**Un-auditable**)
9. Low pressure
10. Tilted/sunken sprinklers

Station 27*

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 62 g.p.m.
4. Precipitation rate (P.R.) – in./hr. (**Un-auditable**)
5. Distribution Uniformity (D.U.) - % (**Un-auditable**)

Station 28

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 53 g.p.m.
4. 'At head' pressure ranges – 20 p.s.i. to 45 p.s.i.
5. Average root zone depth – 7.5"
6. Soil type – sandy-loam
7. Precipitation rate (P.R.) – 1.29 in./hr.
8. Distribution Uniformity (D.U.) - .21
9. Low pressure at some heads
10. Tilted sprinklers

Station 29

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Mixed – turf, shrubs & trees
3. Flow rate – 67 g.p.m.
4. ‘At head’ pressure ranges – 17 p.s.i. to 22 p.s.i.
5. Average root zone depth – 10”
6. Soil type – loam
7. Precipitation rate (P.R.) – .70 in./hr.
8. Distribution Uniformity (D.U.) - .22
9. Low pressure
10. Broken heads

Station 30

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Shrubs & annuals
3. Flow rate – 70 g.p.m.
4. ‘At head’ pressure ranges – 27 p.s.i. to 28 p.s.i.
5. Average root zone depth – 5”
6. Soil type – sand
7. Precipitation rate (P.R.) – .82 in./hr.
8. Distribution Uniformity (D.U.) - .12
9. Low pressure
10. Arc misalignment
11. Tilted or plugged heads
12. Heads do not pop-up clear of shrubs

Station 31

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 71 g.p.m.
4. ‘At head’ pressure ranges – 30 p.s.i. to 35 p.s.i.
5. Average root zone depth – 5.5”
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.25 in./hr.
8. Distribution Uniformity (D.U.) - .36

Station 32

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Turf
3. Flow rate – 77 g.p.m.
4. 'At head' pressure ranges – 27 p.s.i. to 32 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.73 in./hr.
8. Distribution Uniformity (D.U.) - .18
9. Low pressure at some heads
10. Broken and/or buried heads

Controller BStation 1

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Shrubs
3. Flow rate – 43 g.p.m.
4. 'At head' pressure ranges – 30 p.s.i. to 45 p.s.i.
5. Average root zone depth – 9"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.0 in./hr.
8. Distribution Uniformity (D.U.) - .45

Station 2

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 55 g.p.m.
4. 'At head' pressure ranges – 28 p.s.i. to 30 p.s.i.
5. Average root zone depth – 7"
6. Soil type – sand
7. Precipitation rate (P.R.) – .13 in./hr.
8. Distribution Uniformity (D.U.) - .34
9. Low pressure at some heads
10. Slow drainage or ponding
11. Compaction

Station 3

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 36 g.p.m.
4. 'At head' pressure ranges – 30 p.s.i. to 32 p.s.i.
5. Average root zone depth – 4.5"
6. Soil type – loam
7. Precipitation rate (P.R.) – .21 in./hr.
8. Distribution Uniformity (D.U.) - .41
9. Missing and/or broken heads
10. Compaction

Station 4**NOT AUDITED – BUBBLERS**Station 5

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 41 g.p.m.
4. 'At head' pressure ranges – 45 p.s.i. to 48 p.s.i.
5. Average root zone depth – 4.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .20 in./hr.
8. Distribution Uniformity (D.U.) - .38
9. Compaction

Station 6

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 29 g.p.m.
4. 'At head' pressure ranges – 45 p.s.i. to 46 p.s.i.
5. Average root zone depth – 4.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .17 in./hr.
8. Distribution Uniformity (D.U.) - .48
9. Compaction

Station 7

1. Application Technology – Pop-up rotor heads
2. Plant type(s) - Turf
3. Flow rate – 54 g.p.m.
4. 'At head' pressure ranges – 43 p.s.i. to 47 p.s.i.
5. Average root zone depth – 4.5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .19 in./hr.
8. Distribution Uniformity (D.U.) - .45
9. Compaction

Station 8

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Turf
3. Flow rate – 45 g.p.m.
4. 'At head' pressure ranges – 38 p.s.i. to 40 p.s.i.
5. Average root zone depth – 11"
6. Soil type – sand
7. Precipitation rate (P.R.) – .28 in./hr.
8. Distribution Uniformity (D.U.) - .39
9. Compaction

Station 9

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Shrubs
3. Flow rate – 78 g.p.m.
4. 'At head' pressure ranges – 34 p.s.i. to 36 p.s.i.
5. Average root zone depth – 3.5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .88 in./hr.
8. Distribution Uniformity (D.U.) - .50
9. Missing and/or broken heads
10. Compaction

Station 10

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Shrubs
3. Flow rate – 72 g.p.m.
4. 'At head' pressure ranges – 28 p.s.i. to 40 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.34 in./hr.
8. Distribution Uniformity (D.U.) - .37
9. Low pressure at some heads

Station 11

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Mixed: turf, trees, shrubs
3. Flow rate – 71 g.p.m.
4. 'At head' pressure ranges – 33 p.s.i. to 36 p.s.i.
5. Average root zone depth – 9"
6. Soil type – sand
7. Precipitation rate (P.R.) – 1.78 in./hr.
8. Distribution Uniformity (D.U.) - .38
9. Plugged heads
10. Compaction

Station 12

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Mixed: turf, shrubs, annuals
3. Flow rate – 73 g.p.m.
4. 'At head' pressure ranges – 35 p.s.i. to 39 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .91 in./hr.
8. Distribution Uniformity (D.U.) - .50
9. Short risers
10. Compaction

Station 13

1. Application Technology – Pop-up spray heads
2. Plant type(s) - Shrubs
3. Flow rate – 60 g.p.m.
4. 'At head' pressure ranges – 44 p.s.i. to 45 p.s.i.
5. Average root zone depth – 7"
6. Soil type – sand
7. Precipitation rate (P.R.) – .79 in./hr.
8. Distribution Uniformity (D.U.) - .10
9. Missing and/or broken heads

Station 14

NOT AUDITED – BUBBLER ZONE

Station 15

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Mixed: shrubs & annuals
3. Flow rate – 60 g.p.m.
4. 'At head' pressure ranges – 32 p.s.i. to 36 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – 1.25 in./hr.
8. Distribution Uniformity (D.U.) - .29
9. Missing and/or broken heads
10. Tilted heads
11. Plugged heads

Station 16

1. Application Technology – Pop-up spray heads
2. Plant type(s) – Turf
3. Flow rate – 43 g.p.m.
4. 'At head' pressure ranges – 44 p.s.i. to 46 p.s.i.
5. Average root zone depth – 9"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – 1.5 in./hr.
8. Distribution Uniformity (D.U.) - .28
9. Tilted heads

Station 17

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Turf
3. Flow rate – 17 g.p.m.
4. 'At head' pressure ranges – 40 p.s.i. to 45 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .31 in./hr.
8. Distribution Uniformity (D.U.) - .30
9. Tilted heads
10. Arc misalignment

Station 18

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Mixed: turf & trees
3. Flow rate – 63 g.p.m.
4. 'At head' pressure ranges – 32 p.s.i. to 38 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sand
7. Precipitation rate (P.R.) – .27 in./hr.
8. Distribution Uniformity (D.U.) - .36
9. Low pressure
10. Tilted heads

Station 19

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Turf & trees
3. Flow rate – 36 g.p.m.
4. 'At head' pressure ranges – 42 p.s.i. to 46 p.s.i.
5. Average root zone depth – 8"
6. Soil type – sandy loam
7. Precipitation rate (P.R.) – .26 in./hr.
8. Distribution Uniformity (D.U.) - .69

Station 20

1. Application Technology – Pop-up rotor heads
2. Plant type(s) – Turf
3. Flow rate – 51 g.p.m.
4. 'At head' pressure ranges – 20 p.s.i. to 22 p.s.i.
5. Average root zone depth – 5"
6. Soil type – sandy
7. Precipitation rate (P.R.) – .12 in./hr.
8. Distribution Uniformity (D.U.) - .19
9. Lateral line leaks
10. Low pressure

* Un-auditable due to low pressure resulting in heads not popping up high enough to clear the turf.

RECOMMENDATIONS:

1. Increase discharge pressure downstream of control valve to 65 p.s.i. at 90 g.p.m. by making the required adjustments to the pressure reducing pilot/pump control settings
2. Change nozzles where needed to achieve:
 - A. matched precipitation rates
 - B. proper coverage
 - C. increased distribution uniformity's
 - D. increased precipitation rates
3. Change heads, where required, so all heads within each zone are the same make and model.
4. Align, raise, and straighten all heads – all heads must be vertically and horizontally straight with the nozzle able to clear all vegetation
5. Fix leaks and breaks in piping and heads
6. Program controllers according to our proposed schedules
7. Monitor and adjust schedules for fine tuning (big changes should not be necessary)
8. All zones where the increased pressure results in pressures in excess of 40 p.s.i. at spray heads it is recommended pressure-compensating heads be installed. If this proves too costly, the installation of pressure reducing valves is recommended.
9. After all the above have been completed, re-test the most critical zones for 'at head' pressures to determine if proper pressure is present. If problems still exist, further exploration/trouble shooting would be required.
10. It is highly recommended all 'future' irrigation systems within Hunter Creek are designed by an independent irrigation consultant. The consultant should also provide construction observation to insure the systems are installed 'per the design'. This approach would provide the best overall long-term value to Hunter's Creek by providing the following:
 - A professional design that considers both construction and maintenance costs.
 - All irrigation systems will be designed with a 'big picture' approach as the designer will be looking at the current and future needs of the development during each design.
 - Central control, if implemented, would greatly benefit from a single entity having total knowledge of what exists, what is currently being installed, and any future plans. This will provide a more efficient and well-coordinated development approach resulting in lower overall operating costs.
11. Move flow meter to 40" downstream and 20" upstream of the nearest fitting (i.e. "T", 90, coupling, etc.) per manufacturers specifications accurate flow data.

CONCLUSIONS:

In general, most zones are under pressurized but in reasonably good functional operation (some exceptions were noted). Increasing the discharge pressure to 65 p.s.i. at 90 g.p.m. should result in most, if not all, zones being adequately pressurized (30-40 p.s.i. for the Toro spray heads and 50-60 p.s.i. for Hunter rotors). Proper pressurization will greatly improve distribution uniformities, increase the precipitation rates, and provide better overall coverage resulting in healthier plant material and a more manageable irrigation system.

This improved performance coupled with the above recommendations, including the implementation of proper watering schedules, should allow the entire site to be irrigated every other day within a 10.5 hour daily watering window (controller A one day and controller B the other) using the existing single pump station. During periods of drought and/or no rainfall, this will not be adequate to maintain a healthy and beautiful looking landscape. To allow for daily watering of **all** zones, a second pump station and well, would need to be installed and two separate systems created using one controller for each. This would require some re-wiring at the controllers, an additional 4" mainline under Hunter Vista, and an electrical panel upgrade. The only other way to obtain daily watering capability is the continued use of pump stations from existing systems and the opening of gate valves thus allowing these systems to be connected. This scenario is not workable with the Rain Bird Maxicom2 central control system. If Maxicom2 is to be ultimately installed, the prior solution would be required.

TERMINOLOGY

Application rate – the depth of water applied to a given area, usually measured in inches per hour

Distribution uniformity (D.U.) – the ratio of the average low-quarter depth of irrigation water infiltrated to the average depth of irrigation water infiltrated, expressed as a percent.

Flow rate – is the measure of the quantity of water moved in a given time and is usually measured as gallons per minute.

Precipitation rate – is the speed at which water is applied to soil from a sprinkler source and is measured as total gallons per minute applied (inches/hour).

Pressure regulators – can improve the uniformity of irrigation applications when elevation differences or multiple controllers on a mainline produce variations in pressures at sprinkler heads. If the source pressure varies, then sprinkler pressure will vary unless the variations can be controlled at the source with a pressure regulator. Fixed pressure regulators are simple, in-line devices which maintain a relatively constant, pre-set downstream pressure over a range of flow rates.

PROPOSED WATER SCHEDULE

CONTROLLER/ STATION #	Start time #1/ minutes	Start time #2/ minutes	TOTAL TIME/DAY
A-1	5	5	10
A-2	5	5	10
A-3	6	6	12
A-4	7	7	14
A-5	7	7	14
A-6	NOT-AUDITED		
A-7	7	7	14
A-8	NOT-AUDITED		
A-9	29	29	58
A-10	NOT-AUDITED		
A-11	NOT-AUDITED		
A-12	8	8	16
A-13	8	8	16
A-14	4	4	8
A-15	4	4	8
A-16	7	7	14
A-17	5	5	10
A-18	7	7	14
A-19	NOT-AUDITED		
A-20	NOT-AUDITED		
A-21	NOT-AUDITED		
A-22	27	27	54
A-23	9	9	18
A-24	6	6	12
A-25	25	25	50
A-26	NOT-AUDITED		
A-27	NOT-AUDITED		
A-28	5	5	10
A-29	8	8	16
A-30	8	8	16
A-31	6	6	12
A-32	4	4	8

PROPOSED WATER SCHEDULE

CONTROLLER/ STATION #	Start time #1/ minutes	Start time #2/ minutes	TOTAL TIME/DAY
B-1	7	7	14
B-2	47	47	94
B-3	31	31	62
B-4	NOT-AUDITED		
B-5	35	35	70
B-6	40	40	80
B-7	37	37	74
B-8	47	47	94
B-9	8	8	16
B-10	5	5	10
B-11	4	4	8
B-12	8	8	16
B-13	10	10	20
B-14	NOT-AUDITED		
B-15	6	6	12
B-16	5	5	10
B-17	22	22	44
B-18	25	25	50
B-19	16	16	32
B-20	47	47	94

NOTE:

1. These schedules assume .75 D.U. is obtainable after the recommendations are instituted.
2. Schedules make no allowance for rainfall.
3. These are maximum run times.
4. Schedules are only approximations. Actual field conditions may alter/change these schedules.

SECTION THREE

APPROACH TO WORK

3. Approach to Work

Based on previous experience conducting landscape irrigation audits for homeowners Masuen Consulting has devised an innovative approach to deliver the water conservation message. We propose to provide a two-man team composed of a Horticulture Consultant and a Landscape Irrigation Auditor. The team would work as follows.

After receiving the name and address of the homeowner the Irrigation Auditor would set up an appointment and obtain a plot map of the residence. The plot map would be converted into a CAD-based drawing and brought to the site in a laptop computer. Upon arrival at the residence the team would do a brief walk-thru with the homeowner to become acquainted with the irrigation system. The team would then split up with the Horticulture Consultant taking the homeowner through the landscape and making recommendations as to plant selection, landscape design and general horticultural practices.

While the homeowner is with the Horticulture Consultant the Irrigation Auditor will audit each irrigation zone, note any irrigation maintenance issues, check nozzles for application rates, take measurements, etc. The Auditor will type up a report of their findings and provide a printed copy to the homeowner. This report will include, but not be limited to, a diagram of the property with sprinkler head locations and zones, and repairs needed; recommendations for controller/rain sensor adjustments, and recommendations for sprinkler system adjustments to improve performance. When the Horticultural Consultant is finished with the homeowner then the Irrigation Auditor will walk the homeowner through the property discussing the Irrigation Report and diagram of the property noting repairs/adjustments needed.

While the Irrigation Auditor is conducting the walk-thru/review of the Irrigation report, the Horticulture Consultant will type up a report with landscape recommendations and findings as discussed in the walk-thru. Once each team member has walked thru the property and their respective report with the homeowner, they will present both reports to the homeowner, along with a copy of "WATERWISE Florida Landscapes" from Florida's water management districts, and a list of additional reference materials/sources.

It is felt that this approach will result in a greater understanding of water conservation and better demonstrate to the homeowner ideas and concepts they can implement on their property. The homeowner will be able to observe what is detailed in the report, ask questions of the Irrigation Auditor and Horticulture Consultant while they are on-site, and have the written report to refer to after the team has left.

The team will submit each week's reports to Seminole County the following week.

SPRINKLER SYSTEM EVALUATION

For: Mr. & Mrs. Smith
123 Anywhere Ln. Seminole County FL

Evaluation Date: Month, day, 2003

Soil Type: Sandy

Root Depth: 6 1/2" avg.

Rain Sensor: YES

Irrigation Evaluation Results:

A. The following is a list of problems that result in poor irrigation system performance, and excessive use of water:

1. Poor irrigation design
 - a. poor head spacing
 - b. improper pipe sizing and layout
 - c. non-matched precipitation rates
 - d. turf and shrubs mixed together on the same irrigation zone
 - e. mixed zones with sprays and rotors
 - f. mixed heads on same zone – different manufacturers products
2. Poor maintenance
 - a. Tilted, sunken, and/or clogged sprinkler heads
 - b. Replacing heads and/or nozzles with different types than original design
 - c. Head no longer sprays over the turf, shrubs, etc. due to growth
 - d. Missing, cracked, or broken heads
 - e. Valves do not activate from controller
3. No pressure regulation at the sprinkler head or the remote control valve.
In general for urban landscape applications, spray heads operate best at 30 PSI and rotor heads operate best at 50-70 PSI depending on application.
4. No check valves in sprinkler heads where there are elevation changes.
5. Nozzle is blocked from covering it's entire coverage area
 - a. four inch pop-ups in St. Augustine turf
 - b. risers which are too low – do not throw over but throw into plant material
 - c. four or six inch pop-ups in annual and groundcover beds

B. To correct these problems:

1. Have a qualified irrigation designer design a new layout for the system.
 - c. As nozzles are replaced, standardize the type of nozzle used (i.e. Hunter, Rain Bird, etc.)
 - d. Separate turf and shrubs/planting beds into separate irrigation zones.
 - e. Separate zones into all spray and all rotor zones.
 - f. As heads are replaced, standardize the type of sprinkler head used.
2. See "Recommended Irrigation Maintenance Checklist" enclosed.
3. Install heads with pressure regulator or add pressure regulator to control valve.
4. Install check valves in heads at low points in the landscape to prevent low head drainage.

5. Use 6" pop-ups in turf, 12" pop-ups in ground cover/planting beds, and in shrub beds use pop-up heads on risers. Insure each head is able to adequately cover its entire coverage area without any distortion/interference of the arc.

C. Specific Problems and Recommendations:

- Set rain sensor to 1/8" for all months except June, July, and August. During June, July, and August, set the rain sensor at 1/4".
- Zone 2 - turn flow on bubblers down. Cap all bubblers on mature plants which receive water from spray heads.
- Zone 3 has low pressure at sprinkler heads. See Standard Recommendations Handout.

IRRIGATION SCHEDULE

Based on Proper Design and Maintenance

- **Start Time** is the number of cycles a zone is programmed to run per water day.
- **Run Time** is the amount of time at zone should run per start time.
- **Water Days** is the number of days per week/ month, the irrigation system should be scheduled to run.

Zone /Type	Plant Type	Dec-Jan-Feb			March-Nov			April-May-Sept-Oct			June-July Aug		
		Start time	Run Time	Water Days	Start time	Run Time	Water Days	Start time	Run Time	Water Days	Start time	Run Time	Water Days
Rotor	Turf	1/day	19 min	1/mo.	1/day	31 min	1/week	1/day	22 min	2/week	1/day	27 min	2/week
Rotor	Shrubs	None	None	none	1/day	27 min	1/week	1/day	30 min	1/week	2/day	25 min	1/week
Spray	Turf	1/day	21 min	1/mo	1/day	15 min	1/week	1/day	15 min	2/week	1/day	15 min	2/week
Spray	Shrubs	None	None	none	1/day	18 min	2/mo	1/day	16 min	1/week	2/day	14 min	1/week

Horticulture Evaluation Results:

- A. The following is a list of problems that can result in an unhealthy, non-thriving landscape. This can lead to excessive use of water, weed invasion, pest invasion, unsightly appearance, increased plant mortality, shortened life of plant material, and an increase in pesticide, herbicide, and fertilizer use.
1. Plants scattered throughout lawn area.
 2. Shrubs being watered with turf areas
 3. St. Augustine sod is a high water consumer
 4. High water use plants in dry landscape conditions.
 5. Using plants that are not adapted to your *hardiness zone*.
 6. Insufficient mulch in planting beds.
 7. Beds or turf areas which are not easily irrigated (i.e. - 2' strip of turf)
- B. To correct these problems:
1. Group plants together in large beds.
 2. Turf areas should be irrigated separate from shrubs/planting beds.
 3. Convert St. Augustine to Bahiagrass when possible in dry landscapes.
 - a. Use ground covers and shrubs with small areas of turfgrass.
 - b. Use turf where it has practical use such as play areas or erosion control.
 4. Use plants, which are rated as low-water use or drought-tolerant.
 - a. Match plants to conditions: moisture loving plants in moist to wet areas, and plants that need dry conditions in dry areas.
 5. Determine which plants will succeed in your area by locating which *hardiness zone* you live in. (Seminole Co. ranges from 9, 9A to 9B)
 6. Mulch 2-3" deep. Keep mulch 2-3" from stems and trunks of plants. Mulch prevents loss of water by evaporation and suppresses weeds.
 7. The size of turf and shrub areas should account for limitations in the irrigation system.
- C. Specific Problems and Recommendations:
1. Remove the sod and expand shrub beds in the shady area under the oak tree.
 2. Replace annuals at front door with Gallardia (Blanket Flower) or Ruellia caroliniensis (Wild Petunia).
- D. Managing Your Florida Lawn
1. Proper mowing practices – height and frequency of cut
 - a. St. Augustine (Floritam) – cut to 3" - 4"
 - b. remove no more than 1/3 the height of the grass blade.

Recommended Resources

Florida Lawn Handbook – Kathleen Ruppert & Robert Black
Your Florida Landscape – Dr. Robert Black and Dr. Kathleen Rupert

These books are published by the University of Florida and can be ordered at your local Agriculture Extension Office or through their web site at: www.edis.ifas.ufl.edu




WaterWise Florida Landscape Guide, Florida's Water management Districts 1-800-RALLY-22

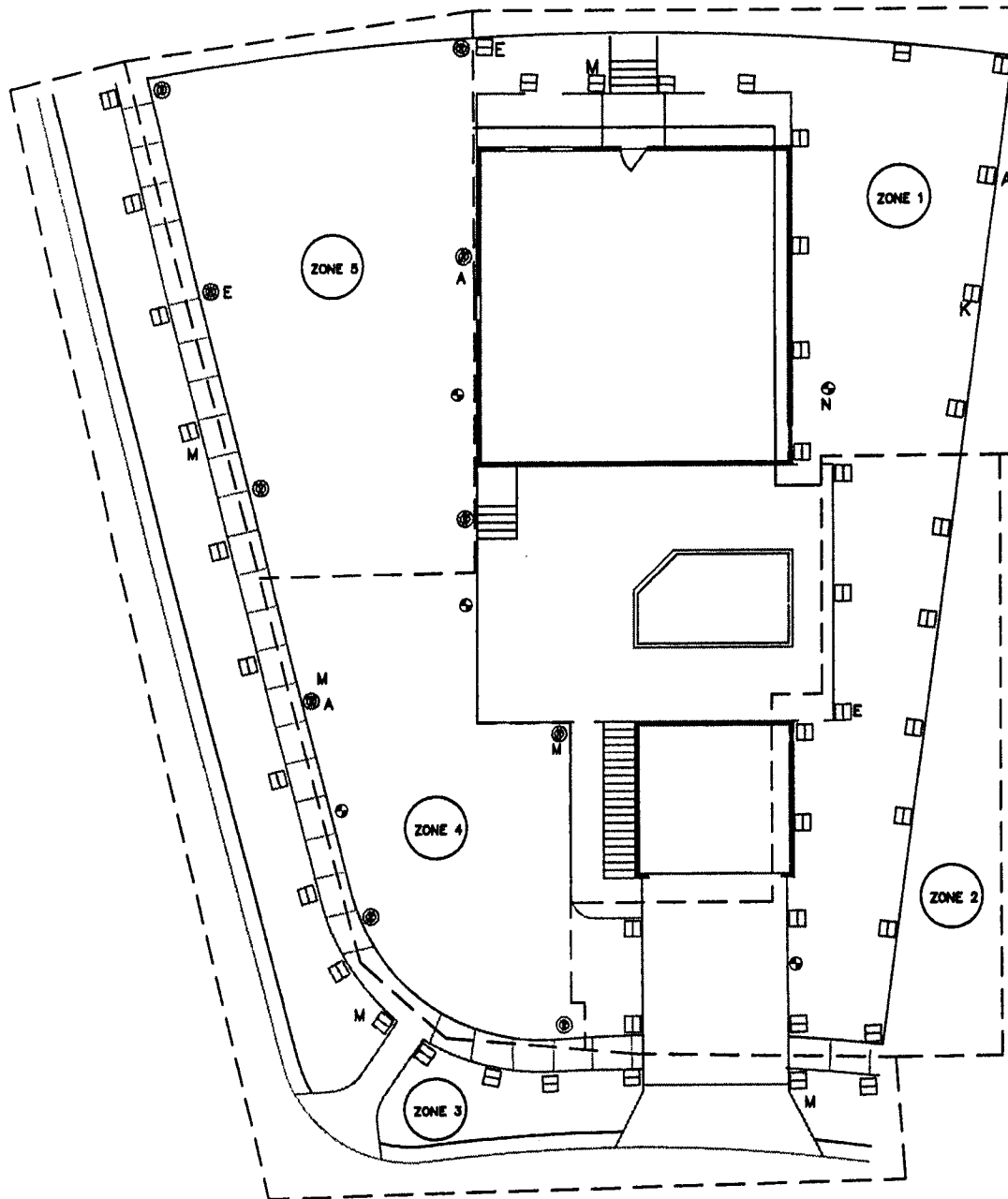
Florida yards & Neighborhoods Landscape Workshops – call for workshop dates
Lake County Water Authority (353) 343-3777 x 30
Lake County Extension Office (352) 343-4101 – Teresa Watkins

RECOMMENDED IRRIGATION MAINTENANCE CHECKLIST

1. Every irrigation zone should be checked monthly. These inspections should include the following:
 - A. Turn on each zone from the controller to verify automatic operation
 - B. Check remote control valve for presence of a pressure regulator (if applicable). Ensure it is set at the appropriate pressure.
 - C. Check flow control and adjust as needed; insure valve closure within 10-15 seconds after shut off at controller
 - D. Check for any signs of a leak – mainline, lateral lines, valves, heads, etc.
 - E. Check all heads as follows:
 1. Proper set height (top of sprinkler is 1” below mow height)
 2. Verify head pop-up height – 6” in turf, 12” in ground cover, and riser in shrub beds
 3. Check wiper seal for leaks – if leaking clean head and re-inspect. If still leaking replace head.
 4. Check all nozzles for proper pattern, clogging, leaks, correct make & model, etc. – replace as needed
 5. Check for proper alignment – perfectly vertical; coverage area is correct; minimize overspray onto hardscapes.
 6. Riser height raised/lowered to accommodate plant growth patterns and insure proper coverage.
 7. Check for low head drainage. If present install head(s) with built-in check valve.
 8. Check head pressures per zone. Compare to baseline data. If deviation from norm is noted, determine cause.
 9. Check for misting/fogging. If present install head(s) with built-in pressure regulation.
 - F. Check rain shut off device for proper operation.
 - G. Check controller programming. Check schedules and change to meet the seasonal and site specific demands of the landscape.

IRRIGATION REPAIR/PROBLEM LEGEND

SYMBOL	DESCRIPTION
	SPRAY HEAD
	ROTOR HEAD
	CONTROL VALVE
A	BROKEN SPRINKLER HEAD
B	BROKEN LATERAL LINE
C	BROKEN MAINLINE
D	LEANING HEAD
E	CHANGE NOZZLE
F	ROTOR NOT ROTATING
G	HEAD TOO LOW
H	RAISE/LOWER RISER
I	MOVE HEAD TO PROVIDE BETTER COVERAGE
J	LEAKING VALVE
K	NEED CHECK VALVE IN HEAD
L	NEW PRESSURE REGULATING RCV
M	NEED PRESSURE REGULATING HEAD
N	REPLACE VALVE
L	REPLACE HEAD
M	LEAKING WIPER SEAL
N	ADJUST SPRAY PATTERN TO PROPER COVERAGE



MR. AND MRS. SMITH
123 ANYWHERE LANE
SEMINOLE COUNTY, FL

Section 4
Price Proposal

4. Price Proposal

The per zone price for this proposal is: **\$80.00**

This price incorporates all operating, equipment, and transportation costs.