Campus-Wide Irrigation Efficiency Project

California State University, Northridge
Sustainability

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Background & Campus Location

General Info
• Located In LA
• Founded in 1958
• Largest CSU’s

Population
• Students: 41,548
• Staff: 1,818
• Faculty: 2,155

Size
• Building GSF: 7,362,074
• Acreage: 356
## Goals and Mandates

<table>
<thead>
<tr>
<th>Mandate Type</th>
<th>Mandate Details</th>
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<tbody>
<tr>
<td><strong>CSU Mandates</strong></td>
<td>• 0% by 2016</td>
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<td></td>
<td>• 20% by 2020</td>
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<tr>
<td><strong>State Mandate</strong></td>
<td>• 25% by 2016</td>
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<td><strong>CSUN’s Goal</strong></td>
<td>• 15% by 2023</td>
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<tr>
<td><strong>Local Mandate</strong></td>
<td>• 16% by 2016</td>
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CSUN’s Water Consumption

Water conservation baseline 16% below 2013

Water Consumption 2013:
• 247 million gallons
• $1.1 million ($0.004/gallon)

LADWP 16% Reduction Goal
• 208 million gallons

39 million gallons
How did we achieve a 39 million gallon reduction goal?

What strategies did we try?

• Low flow toilets
• Low flow aerators
• Low flow and waterless urinals
• Signage in restrooms
• Drought tolerant landscaping
• Turf removal and shut downs
• Hydrogel technology
• *Irrigation System Efficiency Upgrades*
Irrigation Efficiency Project

Goal
The goal of this project was to ensure that the University exceeded the state and local water conservation goals while being budget conscious and reducing labor.

Strategy
Many strategies were considered, including replacing all of the controllers with new smart controllers with a great user interface, water consumption monitoring, etc. – unfortunately the cost very prohibitive at +/- $460,000. We opted to modify and upgrade our existing irrigation control system that was piecemealed together over the last 20 years.
Irrigation System Layout

Central Control System

Field Controller
  - MV
    - FS
    - ZV
  - MV
    - FS
    - ZV
  - MV
    - FS
    - ZV
Project Scope

Each of the 63 controllers will received the following:
• Bidirectional Communication
• Evapotranspiration (ET)
• Flow Sensors
• Master Valves
• Head End Display
Each controller was connected to our centralized irrigation system – computer located in Grounds Shop.
- This allows constant communication between the field controllers and the central control system.
- Allows for immediate system updates.
Evapotranspiration (ET)

ET is gathered from our irrigation weather station. ET is a calculation that takes into account wind, rain, temp, etc. to calculate water needs. The irrigation controllers will grab this ET value and automatically adjust irrigation times as needed.

- While this system is functioning we have found that the human touch seems to be a more effective.
Flow Sensors

Flow sensors allow the central control system to monitor flow (water consumption) at the zone level.

- Critical part of the irrigation system that was never installed.
- Each controller received one flow sensor.
Master Valves

Master valves are operated by the zone controllers and can be commanded by the central control system. These valves essentially allow water to flow to the various irrigation zones from the main point of connection.

• Critical part of the irrigation system that was never installed.
• Each controller received one master valve.
Head End Display

Providing an easy to understand and use tool for the Grounds Shop was a crucial part of this project.

- Allows for instant access to current system issues
- Provides description and locations of known issues
- Helps shop to tackle issues immediately vs waiting for a work control call
Commissioning

Commissioning has been underway for a year and is scheduled to be completed this summer. What's involved?

- Ensuring the system is 100% leak free
  - Checking for leaks, breaks, failing heads, etc.
- “Teaching” the controllers the proper flow rates
  - Running the system through each zone and allowing the system to read the min and max flow rates
Project Outcomes

Cost Savings
Utilizing our existing equipment and making major upgrades we were able to accomplish what we wanted, a "Smart Irrigation System" for a fraction of the cost.

Water Savings
This project played a major role in CSUN exceeding the local water conservation goal by 6% with a total annual savings of over 55,000,000 gallons/year and $150,000/year.

Labor Savings
The Irrigation Display Screen that was developed in house not only saved the campus money and provided a great learning experience for the MIS students but it has also increased our labor efficiency.

Student Learning Opportunities
Software development, programing, design, mapping, GPS, etc.
Future Plans

Now that we have the system fully functioning… what more can we do with it?
Mapping Zones

Migrate from hand drawn maps to digital maps
- Utilize GIS to add data about zones
  - Locations of flow sensors and master valves
  - Irrigation nozzle type and quantity
  - Plant material type
Irrigation: Sprinkler Locations
Understanding Water Consumption

**Visualize water consumption**
- Adding water consumption data to zone maps
  - Helps to better understand water usage across campus
  - Ability to compare irrigation schedules for various plant types
  - Easy to spot “Hot Spots” = too much irrigation
Thank You

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