

# A Flagship Stormwater Solution Saves Developer Millions

## Modular Wetlands® System Linear



### Introduction

Audie Murphy Ranch is a newly developed master planned community in Menifee, California and named after one of the most decorated American combat soldiers of World War II. Menifee is centrally located in the heart of Southern California between San Diego County and Los Angeles County. Within this new 450-acre residential development, there are a number of exclusive amenities: a brand new elementary school, club house, parks/open spaces, and an eventual 1,410 private residential properties.

During the initial stages of design and construction (prior to Bio Clean's consultation), project engineers planned for two massive non-proprietary bioretention systems to address the site's drainage and stormwater treatment requirements. These initial BMPs (Best Management Practices) were excessive in size compared to their treatment capacities and presented immense construction challenges.

### Situation

Each planned BMP formed two river beds or "paseos" that were intended to collect stormwater runoff from the development's 195 acres of impervious surfaces (60 acres of streets and 135 acres of roof and driveway areas). The developer nor the contractor realized that the two paseos would not only consume 50 acres of the 450-acre property, representing 11% of the total development, almost 3-times the size of the elementary school - but after breaking ground on the trenches and river rock processing, contractors began to project an added 2 years of construction time at a cost of nearly \$3 million dollars.



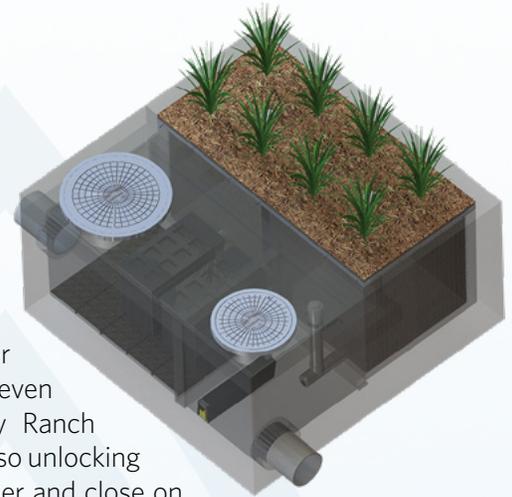
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### Challenge

John Hayden, one of Bio Clean’s veteran stormwater designers, was asked to evaluate the project’s existing stormwater management plan and provide insight. Immediately, John recognized a vastly more efficient solution. Within minutes he had formed a sketch and quote that would end up saving the developer millions of dollars and over a year of development. This incredible solution and alternative to their turmoil was the Modular Wetlands System Linear (MWS Linear), shown in Figure A. Introducing the MWS Linear’s collection of advantages immediately provided substantial benefits. Overnight, the contractor was able to suspend the construction on the first of the two river beds, whose build was already underway and demanding so much rock fill that a processing plant was established on-site just to produce the 85 million pounds of rock needed for construction.

Figure A: Modular Wetlands® System Linear (Side-by-Side Orientation)



### Solution

As opposed to acres of custom land movement, construction time, and millions of dollars spent in labor and resources, the developers had a seemingly over-the-counter, cost-effective solution. What was prescribed is the stormwater industry’s flagship solutions and is often considered the standard for stormwater compliance. Just 18 weeks after the project’s first review and consultation, seven Modular Wetlands System Linears were delivered to the Audey Murphy Ranch development, marking an astounding 75% cost savings for the customer, but also unlocking the developer’s ability to finalize real estate occupancy permits one year sooner and close on new home sales.

Stormwater System Options	Space and Land Required	Cost	Turnaround Time
<b>Modular Wetlands System Linear</b>	7 Precast Biofiltration Systems Totalling 1,184 Square Feet	Delivered & Installed Units \$503,000	From Consultation to Delivery 18 Weeks
<b>Non Proprietary River Rock “Paseos”</b>	River Rock “Paseos” Totalling 50 Acres  Length = 0.45 miles long Crushed Rock = 440,660 cf (~45 million pounds)	Crushed Rock Estimate \$2,000,000  Lost Land/Real Estate Estimate \$1,000,000  Additional Labor Estimate Unknown	2 Years of Construction (An Estimated 12 Months of Postponed Sales)

The MWS Linear is a precast horizontal flow biofiltration system, and for years this flagship Bio Clean solution has been giving engineers and contractors the ability to save millions in valuable land while fulfilling the contractor’s demands for rapid fulfillment and installation. The Modular Wetlands System Linear also has long-term cost benefits, as it is much easier and cost-effective to maintain over time compared to non-proprietary BMPs.

Not only is the Modular Wetlands System Linear a developer’s best friend - saving millions in land and construction costs - it is a superior treatment system that protects watersheds and impaired water bodies across the country. Its high-performance media and patented horizontal flow show equivalent or better pollutant removal to standard biofiltration. The system has also been issued Full Trash Capture Certification from the California State Water Resources Control Board and it is approved by the Washington State Department of Ecology TAPE program for General Use Level Designation (GULD).

**CONTACT INFORMATION**

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**MODULAR WETLANDS® SYSTEM LINEAR ADVANTAGES**



<p>The Modular Wetlands® System Linear</p> <p>Side-by-Side Orientation</p>	<p>WA TAPE GULD Approval <b>Without Plants</b></p>	<p>✓ With or without plants (open planter or sealed), the system maintains superior performance in any design configuration.</p>
	<p>Can Accept Existing <b>Pipe Below Surface</b></p>	<p>✓ Piping into the system opens up numerous configuration and design options, like downstream of detention usage or diverting for retrofits.</p>
	<p>Works Months Without <b>Requiring Maintenance</b></p>	<p>✓ The easily accessible pretreatment chamber traps and isolates trash, sediments, and hydrocarbons. A unique feature, proven to keep maintenance frequencies &amp; costs at industry-leading lows.</p>
	<p>Can Accommodate <b>High Flow Internal Bypass</b></p>	<p>✓ The Side-By-Side Orientation option allows abnormal high flows to bypass from pretreatment directly to the discharge chamber.</p>
	<p>Design Flexibility <b>&amp; Safety</b></p>	<p>✓ Space-saving design provides low excavation and installation costs, plus there is no dangerous depressed planter or standing water.</p>