C CASE STUDY

SACRAMENTO | REGENERATIVE INFRASTRUCTURE

How Sacramento Valley Station Realises Its Ambition for a Regenerative Urban District

Sacramento is setting a global standard for urban development in the face of climate change, population growth, funding challenges, and constrained water and energy resources.





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Cities around the world are setting ambitious climate goals. And some are rethinking the infrastructure systems needed to deliver them. Sacramento Valley Station (SVS) demonstrates how transportation investment can become a platform for resource stewardship, community development and climate resilience. As the first ever municipality-led project to achieve the Living Community Challenge (LCC) Vision Plan certification by the International Living Future Institute, the City of Sacramento's SVS offers a practical example of how regenerative design can be embedded into the planning, engineering, funding and governance of a new urban district.

Constructed in 1926, SVS sits at the intersection of Northern California's transportation network, building upon Sacramento's historic role as the western gateway of the nation's first transcontinental railroad. The historic train station now serves as the region's primary rail gateway—connecting intercity rail, regional transit, local buses, cyclists, pedestrians and visitors arriving in California's capital city.

Located within downtown Sacramento adjacent to the rapidly transforming Railyards development district, the station area occupies one of the most strategically important pieces of urban land in the region. For city leaders, the question was never simply how to modernise a transit facility, but how to leverage that investment to create broader environmental, economic and social value.

The answer emerged through the Sacramento Valley Station Area Plan: a long-term vision that combines mobility investments, mixed-use development, public open space, ecological restoration, renewable energy and water reuse, within a single comprehensive framework. What makes the project notable is not just the City's scale of ambition, but its commitment to treating the district as a living system—where transportation, utilities, buildings and public spaces work together to generate positive outcomes, rather than merely reducing impacts.



The SVS plan's biophilic design will increase community connection to the natural environment.
Image: Steelblue for City of Sacramento / Perkins&Will

The Challenge

Across North America, transportation infrastructure has traditionally been designed around movement and capacity. Water and energy systems, housing and public spaces are typically planned independently, often managed by different agencies with occasionally opposing goals.

Although the SVS site was already functioning as a critical transportation hub connecting local residents and visitors to state and regional hubs, its operations were fragmented. Rail infrastructure historically created barriers between neighbourhoods, limiting connections between downtown Sacramento and adjacent districts.

Additionally, City officials face growing pressure to address housing demand, climate adaptation, greenhouse gas emissions and limited water resources. Like many communities, Sacramento also faces increasing environmental uncertainty. Drought conditions, rising temperatures, ageing infrastructure and state decarbonisation mandates are reshaping how cities across California think about growth and public investment.

As conventional development plans often focus on minimising environmental impacts, the City wanted to explore whether infrastructure could do more than that. Could a transportation district improve environmental conditions beyond simply reducing impacts? Could water, energy, mobility and new development be organised to support a broader regenerative system?

The project team recognised that achieving meaningful outcomes would require looking beyond individual buildings or isolated infrastructure. Instead, they would need to rethink how the entire district functions in a holistic way. Systems would need to complement one another—through multi-purpose function—to fully realise their potential to regenerate.

That ambition created a significant challenge—regenerative urbanism sounds great on paper but presents significant challenges to deliver. Public agencies must navigate funding limitations, regulatory requirements, changing political priorities and complex stakeholder relationships. Any vision would need to survive decades of implementation challenges while remaining flexible enough to adapt to evolving conditions.

The Response

To guide the project, the City of Sacramento adopted the LCC – one of the world's most ambitious community-scale sustainability frameworks.

Unlike building certification programmes that focus on individual structures, LCC evaluates entire districts based on their performance across seven categories—including place, water, energy, health and happiness, materials, equity, and beauty. The framework encourages participants to move beyond sustainability toward regeneration—a concept that seeks to restore ecological function, while strengthening social and economic outcomes.

For Sacramento, the certification process was not pursued as a sustainability accolade, but rather a framework for organising the project. Working together with planning and urban design firm Perkins&Will, Grimshaw Architects, and global built environment consulting firm Arup, the City developed a bespoke set of regenerative principles for transportation planning, utility systems, public space and ecological function. The resulting plan envisioned a district powered by renewable energy and supported by innovative water infrastructure capable of dramatically reducing dependence on conventional utility systems.

In 2021, these efforts culminated in SVS earning LCC Vision Plan certification as the first ever municipality-led project, establishing a pioneering benchmark for public agencies. This milestone established the project as an international precedent for regenerative urban planning and provides a common set of performance objectives for guiding future implementation phases. The certification also helps to align stakeholders around a vision that will take 10 to 20 years to implement. As infrastructure projects often span political cycles, funding programmes and economic downturns, a shared framework provides continuity even as individual projects evolve.

In Sacramento, the LCC framework highlighted a critical question—if the district is intended to provide ecological regeneration, how would its utility systems work? The answer became one of the project's defining innovations.



The station area will be transformed with plazas, retail, dining, office spaces, affordable housing, a hotel and community park.
Image: Steelblue for City of Sacramento / Perkins&Will

The Solution

At the heart of the SVS Area Plan is the proposed Regenerative Utility Center (RUC)—a concept that demonstrates how the project will turn regenerative theory into physical infrastructure and challenges the traditional function of municipal utility systems.

Most cities operate utility resources in a linear way—water is imported, used and discharged. Wastewater is exported elsewhere for treatment. Energy is generated offsite and delivered through large networks. Stormwater is managed as a burden to be removed as quickly as possible.

The RUC proposes something altogether different. The facility is envisioned as an integrated district-scale resource hub—housing wastewater treatment, water recycling, onsite renewables paired with high-efficiency energy management. Rather than viewing resource streams separately, the approach seeks to capture synergies among them—enabling water and energy to circulate within the development and maximising their usage.

Under the Vision Plan, wastewater generated by the buildings will be treated for non-potable reuse. Stormwater systems will support broader hydrologic and ecological functions rather than simply conveying runoff away from the site. District energy systems will support renewable energy management, enhance efficiencies and strengthen resilience from grid disruption. Collectively, these strategies are designed to help the district move toward net-positive outcomes.

What makes the concept particularly compelling is that it addresses multiple urban challenges simultaneously. For Sacramento, water resilience is increasingly important in a changing climate. Energy systems must support long-term decarbonisation objectives. New development must reduce environmental impacts while accommodating population growth. By integrating these issues into a single infrastructure strategy, the RUC creates opportunities that might not be possible through conventional utility planning.

The RUC is also intended to be visible as many of its technical functions will be showcased to residents and visitors passing through the district. Organising its compact wastewater treatment systems, recycled water storage tanks, heat exchange units and battery storage infrastructure in a transparent way will help the community understand where water and energy come from, how resources are reused, and how infrastructure can contribute to environmental stewardship.

This approach transforms infrastructure from something hidden below ground or on top of buildings into a visible expression of community values.

Perhaps the most impressive aspect of the SVS Area Plan is not the concept itself, but the strategy for delivering it. The City recognised early on that a regenerative district could not be built in a single phase.

The transformation of SVS has unfolded in three distinct phases over nearly two decades. Phase 1 included acquisition of the station property and historic building from Union Pacific and relocating the historic industrial rail infrastructure into its current configuration to support passenger rail. Phase 2 then rehabilitated the historic station and established the initial planning framework for broader district redevelopment. Work in Phase 3 includes improvements to its light rail transit system, utility infrastructure, roadway and cycle track, and the construction of a new station concourse to serve as the nexus of the SVS Area.



The Regenerative Utility Center will distribute both thermal energy and recycled water back to the development.
Image: Steelblue for City of Sacramento / Perkins&Will

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All of these improvements serve to increase land value surrounding the station, making development opportunities attractive to investors.

This incremental delivery model is a defining characteristic of the project. Rather than waiting for complete funding of the entire vision, Sacramento has pursued a sequence of interconnected investments that will gradually move the district forward. Funding has, and will continue to come from multiple sources—including regional transportation measures, state funding programmes such as the Transit and Intercity Rail Capital Program, City transit initiatives, infrastructure grants, and private investment.

District-scale water systems require regulatory coordination and substantial upfront investment. The team coordinated closely with the Sacramento Utilities department to understand how the RUC will reduce reliance on the sewer conveyance network and regional wastewater plant. The RUC plan also proposes to capture and reuse heat from a major sewer main passing through the site. While supportive, the City is still learning how to permit onsite water reuse within its jurisdiction, relying upon progressive statewide standards.

Implementation of the RUC is likely to occur through a shared-use agreement between the facility operator and the new buildings it serves. The RUC's owner-operator will construct the facility based on expected wastewater, recycled water, electrical and heating demands. The building owner-operators will anticipate lower-than-conventional utility costs while realising highly efficient water and energy usage.

Utility infrastructure must remain flexible enough to accommodate uncertain future development schedules. Development of the RUC and the buildings it serves will need to be aligned in scope and schedule as they both rely on one another to realise economic viability. To help manage disparity in market conditions, the RUC systems are designed to start small and scale up as development occurs over time.

A Model for Future Cities

SVS' greatest contribution may be showing how ambitious environmental goals can be woven into the practical realities of public sector delivery. The project demonstrates the value of establishing regenerative principles early enough that they shape implementation decisions, rather than becoming aspirations layered onto projects after the fact.

For cities confronting climate change, resource constraints, ageing infrastructure and continued growth, Sacramento offers a compelling lesson. Transformative outcomes rarely emerge from a single project or funding source. They are built through sustained commitment, coordinated governance and infrastructure systems designed to work together.

The RUC remains the clearest symbol of that vision. More than a utility facility, it represents a new way of thinking about urban infrastructure—one in which energy, water, transportation, ecology and community development are treated not as separate challenges but as interconnected opportunities.