



21st Street Green and Complete Street City of Paso Robles



#### **Project Overview**

As the City of Paso Robles built out its infrastructure in the late 1800s, conveyance of water from Mountain Springs Creek was modified from a natural open channel to a buried storm drain pipe under 21st Street. Historic runoff from the Mountain Springs

Creek watershed, along with subsequent development of the urban areas over the course of several decades resulted in frequent flooding, poor pavement, and inadequate facilities for bicycles and pedestrian traffic.

To improve flooding issues, pedestrian and cyclist safety, and aesthetic beauty, the City of Paso Robles decided to turn 21st Street, between Vine Street and Riverside Avenue, into the first Green AND Complete Street in the County of San Luis Obispo.

#### Project Goals

- Reduce the frequency and severity of street flooding
- Increase stormwater infiltration
- Improve water basin recharge while enhancing stormwater runoff reaching the Salinas River and increasing sediment removal
- Improve pedestrian safety
- Reduce traffic speeds by incorporating traffic calming devices
- Add Class II bike lanes
- Increase shade and aesthetic appeal by planting trees and drought tolerant plants
- Promote infill and redevelopment











With an eye to the future and ear to the ground, the City of Paso Robles brought a national green and complete street expert into the fold to prepare the conceptual design. However, when it came time to select the team for the final design and construction documents, the City's desire was to include local firms as much as possible so that this knowledge of green and complete streets could begin to grow in the local engineering and construction industry.

#### Project Team

- City of Paso Robles
- Central Coast Low Impact Development Initiative
- SvR Design Company
- Cannon
- Earth Systems
- **Raminha Construction**

To encourage knowledge sharing and foster the concept of green and complete streets, the project has been highlighted through white papers and presentations throughout the West Coast, at water and public agency conferences including the following:

- AWWA: 2012 Sustainable Water Management, Portland, Oregon •
- AWWA: 2014 Whole Water Conference, Monterey, California
- ASCE: International Sustainability Conference, Newport Beach, California

The City held many public outreach events and design charretes, at the onset of the project, knowing that the green and complete street concept was "new" and would interest the residents and business owners.

The City applied for and obtained an Urban Greening Grant from the California Natural Resources Agency in the amount of \$993,000 to assist with the funding of this project.











Notable Project Elements

Added approximately 3/4ths of a mile of

bike lanes and ADA pathways





This project came in on schedule and under budget in March of 2014.

As for the original project goals, here is a list of some of the fun facts of this great project.

- Flood Protection: Increased the capacity of the street to convey runoff during large storm events and removed underground storm pipes easily subject to sedimentation
- Water Basin Recharge: For every rain event greater than 0.50 inch, over 50,000 gallons of runoff are treated in bioretention areas and infiltrated into the ground. Additional stormwater is infiltrated through the median stormwater channel and underlying infiltration trench. In just the past three months, there have been nine rain events greater than 0.25 inch, five of which were over 0.50 inch. A rough approximation of the total water recharge over this period is 250,000 gallons (or about the amount of potable water a family of four uses for an entire year!)
- Stormwater Runoff Reduction: Reduced impervious surface area by 26,000 square feet (equivalent to half the size of the adjacent Smart & Final parking lot)
- Bike Lanes: Added approximately 3/4ths of a mile of bike lanes and ADA pathways
- Pedestrian Safety: Added a safe pedestrian railroad crossing
- Traffic Calming: Added bulb-out traffic calming features at each cross street intersection including two flashing beacon crosswalks at the two high traffic volume intersections
- Notable Project Elements

Reduced impervious surface area by 26,000 sq.ft. (equivalent to half the size of the adjacent Smart & Final parking lot)

- Shade and Aesthetic Appeal:
  - o Undergrounded approximately 2,000 feet of overhead power lines and removed 5 power poles
  - o Added street art, informational signage, seating areas, and bike racks
  - o Used low water-use, native-plant landscaping in areas where asphalt was removed
  - o Used gabion basket retaining walls using local Adelaida stone materials and recycled concrete
  - o Installed high-efficiency, decorative lighting along the limits of the project
  - o Planted 81 large native trees that—in several years—will increase shady areas and lower pavement heat radiation
- And, as an added bonus, renewed aging underground infrastructure including over 2,000 feet of sewer main and over 100 feet of water main





#### Construction Schedule, Management, and Control Techniques Used

#### Construction Progress

Properties along 21st Street include a mix of commercial and residential properties with at least one point of ingress/egress fronting 21st that would be impacted by the construction of frontage improvements. To facilitate access and minimize impacts, the City wanted to take a proactive approach with public outreach and community engagement. To keep residents abreast on project progress, the City held weekly stakeholder meetings to establish a two-week look ahead as part of the public outreach programs to more accurately track and report work progress.



#### Scheduling and Control

To assist in keeping the project within expected timelines, weekly and monthly progress scheduling updates were utilized. This process included employing the Critical Path Method of scheduling to develop an efficient and logical project schedule. This method allowed the construction management team to effectively track progress and identify potential construction issues or delays in advance, while allowing adequate time to provide regular updates to project stakeholders.





#### Safety Performance Including Number of Lost-Time Injuries per 1,000 Man-Hours Worked and Overall Safety Program Employed During the Construction Phase

As safety is a major concern with any project, the highest safety standards were maintained by all who worked on the project site. One method used to ensure safety included weekly safety meetings between the City, contractor, and construction manager. Fortunately, throughout the duration of the project, there were no injuries or lost-time.

# Notable Project Elements

Renewed aging underground infrastructure including over 2,000 feet of sewer main and over 100 feet of water main



# Environmental Considerations Including Special Steps Taken to Preserve and Protect the Environment, Endangered Species, etc., During the Construction Phase

#### Vegetation

The City's full Spanish name, El Paso de Robles, translates to "The Pass of the Oaks." As a distinctive feature of the native landscape, oak trees are protected by local ordinances in an effort to preserve the legacy of the oaks. Protection of existing trees—especially the oaks—within the construction area was achieved by installing fencing around sensitive areas. This fencing provided a physical barrier and visual reminder to construction crews as they worked around the protected areas to ensure the trees continued health.

#### Stormwater and Recharge

During construction, the project implemented a Storm Water Pollution Prevention Plan (SWPPP) to ensure stormwater runoff pH and turbidity did not exceed State Water Resources Control Board permit thresholds, thereby protecting downstream habitats including those in and around the Salinas River.

Goals outlined throughout the project included improving stormwater quality reaching the Salinas River, recharging the groundwater table by reducing impervious surfaces, improving safety and mobility for pedestrians and bicycles, cooling the street by shading it with trees, and promoting infill redevelopment.

### Green Street Components

21st Street uses "green infrastructure" systems. This means the street responds to environmental challenges, like flooding, pollution, shrinking aquifers, and rising temperatures, by copying nature. Special landscapes and pavers clean stormwater, decrease flooding, and help rainwater filter into the earth to recharge the groundwater. Street shading will increase as a result of tree protection during construction and the planting of over eighty new trees. 21st Street's landscape is water-wise, being composed of native plants and drought tolerant species adapted to the City's climate.



Increased the capacity of the street to convey runoff during large storm events and removed underground storm pipes easily subject to sedimentation



To reach these project goals, drainage improvements combined bioretention for treatment of initial stormwater flush with open-channel flow for larger runoff. These improvements reduce the frequency and severity of street flooding, increase groundwater recharge, improve the quality of stormwater runoff reaching the Salinas River, and remove pollutants from stormwater draining from the street. Fencing was also installed to protect native soils from compaction where bioretention planters were constructed.

The placement of pervious concrete pavers in pedestrian areas allows stormwater to seep into the ground. Bioretention areas were placed at the edges of the street for treatment of first stormwater flush. These areas were designed without underdrains. The lack of underdrains causes stormwater to

soak into depressed landscape areas and re-enter the water table. Underlying soils trap dirt and chemical particles as the stormwater percolates into the water table or flows to the Salinas River. Drought-tolerant plantings prevent erosion and treat storm runoff biologically. Consequently, stormwater from 21st Street entering the Salinas River is now considerably cleaner than before.

Trenches containing a perforated chamber amid clean rock were also installed where percolation tests indicated high infiltration rates. These trenches retain large quantities of usable stormwater as it infiltrates into the soil. The project incorporated carefully engineered soil mixes, designed to infiltrate at a dependable rate slow enough to provide necessary treatment yet fast enough to allow large volumes of runoff to infiltrate rather than running off.



In addition to protecting as many existing trees as possible, the project included the planting of additional shade trees along the roadway.

Notable Project Elements

For every rain event greater than 0.50 inch, over 50,000 gallons of runoff are treated in bioretention areas and infiltrated into the ground. Additional stormwater is infiltrated through the median stormwater channel and underlying infiltration trench. In just the past three months there have been nine rain events greater than 0.25 inch, five of which were over 0.50 inch. A rough approximation of the total water recharge over this period is 250,000 gallons! (or about the amount of potable water a family of four uses for an entire year!)



Community relations—a summary of the efforts by the agency, consultant and contractor to protect public lives and property, minimize public inconvenience and improve relations

#### Community Workshops

Community involvement and support was of a major concern to the City as they undertook this project. Key requirements of the conceptual, design, and construction phases included forums and educational workshops to not only get feedback from residents, but to also encourage development of complete/green streets throughout San Luis Obispo County.

Notable Project Elements

Added bulb-out traffic calming features at each cross street intersection including two flashing beacon crosswalks at the two high traffic volume intersections

To provide community awareness and drive local support, SvR and the City held a community design workshop for the stakeholders (businesses and residents along the project). This workshop allowed the community to provide input and feedback as to the project features. This approach encouraged local support and helped develop a sense of ownership over the project as it developed.



After the schematic design was developed, the City and SvR provided a public presentation and forum on the project. Cannon prepared a stakeholder exhibit after preliminary design and the City solicited feedback from all the stakeholders. The City had a booth set up during an annual City arts festival with project information and representatives to answer questions.

#### Communication

As a means to reduce frustration of business owners and residents along the project route, the contractor was required to provide notification three working days prior to construction activities. To remind and educate those affected by the construction activity, the City provided a "project handout" which contained material explaining the history of the roadway, and the important aspects of green and complete streets. This material was later turned into educational signage that is posted along 21st Street.



# Notable Project Elements

Planted 81 large native trees that—in several years—will increase shady areas and lower pavement heat radiation

# Notable Project Elements

Along the street, informational signage is posted to educate the public on topics such as: Green Streets, Complete Streets, and the history behind 21st Street and the recent improvements





Unusual accomplishments under adverse conditions, including but not limited to, adverse weather, soil or site conditions, or other occurrences over which there was no control

#### Creek Realignment

21st Street was originally constructed on land that historically served as a tributary of the Salinas River. As such, the roadway had consistently experienced an extreme level of flooding as stormwater naturally made its way into what was essentially a branch of the river.

The new design of 21st Street alleviates this issue while concentrating the runoff into an ad hoc channel. Consequently, the project combined – and preserved – both nature and infrastructure by allowing a road to coexist with a creek channel.

#### Railroad Considerations

The Union Pacific Railroad runs through the center of the City and crosses the eastern section of 21st Street. As this project required major underground work, old sewer lines ran under the railroad, presenting a unique challenge to the design team. Since service along the rail lines cannot be halted, the team had to employ a method different from conventional trenching. To avoid service interruptions, the team decided to utilize the jack and bore method used to install 120' of 8" gravity sewer main in 16" steel casing under the railroad. Additionally, the construction team faced challenges related to utility crossings with limited clearance including fiber optic lines, temporary diversion of sewerage by pumping, and existing utilities limiting the space available for the jacking pits.





Additional considerations you would like to bring to the attention of the project review panel, such as innovations in technology and/or management applications during the project

To promote pedestrian safety, the City added bulb-out traffic calming features at each cross street intersection, including two flashing beacon crosswalks at the two high-traffic volume intersections.

Additional features included installation of high-efficiency, decorative lighting along the limits of the project, the planting of 81 large native trees that will eventually increase shady areas and lower pavement heat radiation, and renewal of aging underground infrastructure including more than 2,000 feet of sewer main and more than 100 feet of water main.

The project increased the street's capacity to convey runoff during large storm events and removed underground storm pipes easily subject to sedimentation.

Deepened curbs, impermeable liners, and trench dams were installed adjacent to bioretention areas and channels to protect the other project features from unwanted subsurface water. For the future, these features will ensure the asphalt roadway base section will remain dry and have a typical lifespan, while ensuring that utility trenches will not become conduits for water flow. By installing these features, it is anticipated to provide infiltration where appropriate while limiting movement of subsurface water in undesireable areas.



Notable Project Elements

Installed high-efficiency, decorative lighting along the limits of the project





# Notable Project Elements

Added numerous aesthetic features including:

- Undergrounding of approximately 2,000 feet of overhead power lines, and removal of 5 power poles
- Street art, informational signage, seating areas, and bike racks
- Low water-use, native-plant landscaping in areas where asphalt was removed
- Gabion basket retaining walls using local Adelaida stone materials and recycled concrete















