

ARROYO SECO SITE RECONNAISSANCE TOUR

DATE: October 23, 2019

ATTENDEES: City of Pasadena, City of South Pasadena, Arroyo Seco Foundation, and Stillwater Sciences

1 REGIONAL WATERSHED OVERVIEW

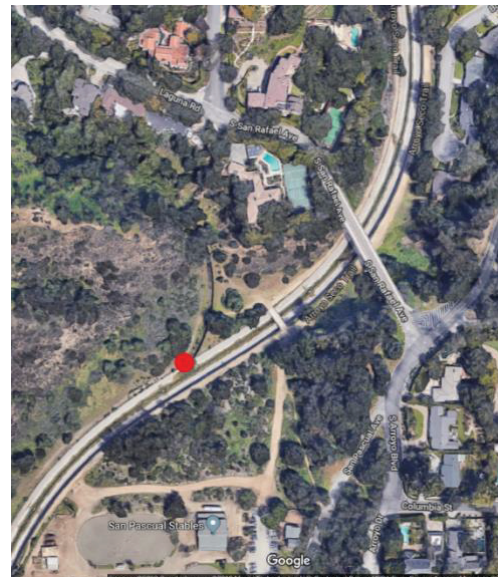
- Introductions and overview by Wendy Katagi, Stillwater Sciences
- Refer to map handouts

2 SAN RAFAEL CREEK

Location: City of Pasadena
Land Use Designation: Parks
Zoning: Open Space (OS)

Project Description

San Rafael Creek is a tributary of the Arroyo Seco located in a canyon just south of La Loma and Laguna Roads. San Rafael Creek is one of the few remaining relatively natural tributaries of the Arroyo Seco, and as such, is worth protecting. It is possible to reduce storm flows enough to warrant removing the concrete lining at the bottom of San Rafael Creek, and to restore the confluence of San Rafael Creek and the Arroyo Seco to a natural state. A watershed-approach to address TMDL issues and valuable healthy lake, stream, wetland, and riparian habitat integrated design could result in an award-winning project for the cities (project boundary for the concept could include both cities) that brings parties into compliance with the RWQCB. The Stillwater Sciences team is comprised of planners, scientists, and engineers who have completed similar projects successfully.



Source: Google 2019

Outlet of San Rafael Creek



Source: North East Trees 2006

Potential project elements include developing a working group of residents and agencies with the goal of identifying ways to protect and restore San Rafael Creek while also respecting private property rights, restoring riparian habitat and removing exotic invasive species from the San Rafael Creek drainage, removing the concrete lining at the bottom of San Rafael Creek to allow for natural treatment of storm flows and urban runoff, restoring the natural confluence of San Rafael Creek and the Arroyo Seco, and developing trails and interpretive materials focusing on stream hydrology and habitat.

The naturalized (soft-bottom) portion of San Rafael Creek is all on private land. A regional storm drain discharges into the upstream end of the concrete-lined portion of San Rafael Creek and is likely a major contributor of flows during storms. Redirecting or attenuating these flows, possibly using natural treatment, treatment wetlands, and other healthy watershed ecologically based approaches, is critical to restoring the San Rafael Creek subwatershed and the Arroyo Seco.



San Rafael Creek channel. Source: Bureau Veritas 2012

San Rafael Creek has been identified as a contributor of bacteria to the Arroyo Seco and was listed in the Load Reduction Strategy (LRS) for the Arroyo Seco as a priority outfall (AS-41). The City of Pasadena has conducted source investigations, televised storm drains, and conducted water quality monitoring and soil/percolation tests as part of the efforts to implement the LRS. Improving groundwater and surface water interactions as well as natural treatment opportunities through wetlands, step pools, riffles, and runs, which allow for oxygenation of water, decreasing excessive algal blooms and stagnant pools along with upstream multi-pronged water quality improvements to Johnson Lake and other opportunities to address *E. coli* concerns.

The Arroyo Seco Trail runs along both sides of the Arroyo Seco channel immediately upstream of the San Rafael Creek confluence. There is a pedestrian bridge connecting the trails on either side of the Arroyo Seco channel. It is possible to follow the Arroyo Seco Trail and connecting trails all the way into the Angeles National Forest in the upper Arroyo Seco watershed. Additionally, there is a network of pedestrian, equestrian, and bicycle pathways to the south of San Rafael creek. Connecting these two networks would provide miles of continuous pathways from the lower to upper Arroyo Seco watershed.



Arroyo Seco Trail at San Rafael Ave Bridge. Source: Bureau Veritas 2012

The City of Pasadena's Green Space, Recreation and Parks Master Plan identifies program needs for natural open space, which include:

- Increased linkages between local trails and to regional trails;
- Protect and preserve open space and the historical and cultural aspects of parks; and
- Additional open space.

2.1 Potential Restoration Goals

1. Floodplain Restoration
 - a. Remove concrete-lined lower portion of San Rafael Creek at confluence.
 - b. Improve aesthetics and habitat value for birds and other native species
 - c. Provide local flood attenuation and groundwater recharge
2. Habitat Creation
 - a. Localized opportunities to create riparian and/or wetland habitat in strategic locations and where concrete is removed
 - b. San Rafael Creek can provide fish habitat and provides opportunities to restore riparian habitat for birds (e.g., California gnatcatcher, yellow warbler) and other wildlife (target species restoration)
 - c. Restore native riparian habitat such as live oak woodland, mulefat scrub, and sage scrub (see Section 3.2.1 for additional details)
 - d. Align with regional biodiversity planning
3. Non-native Vegetation Removal
 - a. Remove exotic invasive vegetation including giant reed (*Arundo*), pampas grass, French broom, ivy, tree of heaven, palms, and others (see Section 3.2.1 for additional details)
4. Regional Trail Connectivity/River Greenway

- a. Arroyo Seco Trail
- b. Equestrian trails
- c. Provide linkage between Arroyo Seco Trail and South Pasadena trail network such as the new Arroyo Seco Bicycle and Pedestrian Path
5. TMDL Compliance Implementation
 - a. BMPs and storm drain integration to reduce storm flows and bacteria loading
 - b. Reduce channelized storm runoff with ecologically-based BMPs at storm drains and catch basins.
 - c. Investigate San Rafael Creek watershed approach to Johnson's Lake and other systemic water quality challenges including opportunities for integrated lake improvements such as natural treatment, treatment wetlands, pool-riffle-run morphology, and lake sediment management.
6. Groundwater/Surface Water Interactions Study
 - a. Need to better understand groundwater and surface water interactions to maximize sustainable opportunities for restoring native habitat and natural cleansing of urban runoff and storm flows.

2.2 Hydraulic Study Information

Area of Concern 4 is located immediately north of La Loma Boulevard.

- Lots of existing open space and no human flood risk in the area.
- Hydraulic analysis shows overtopping of channel.

While potential effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.5 Area of Concern 4: Sections 2651.76-2628.57

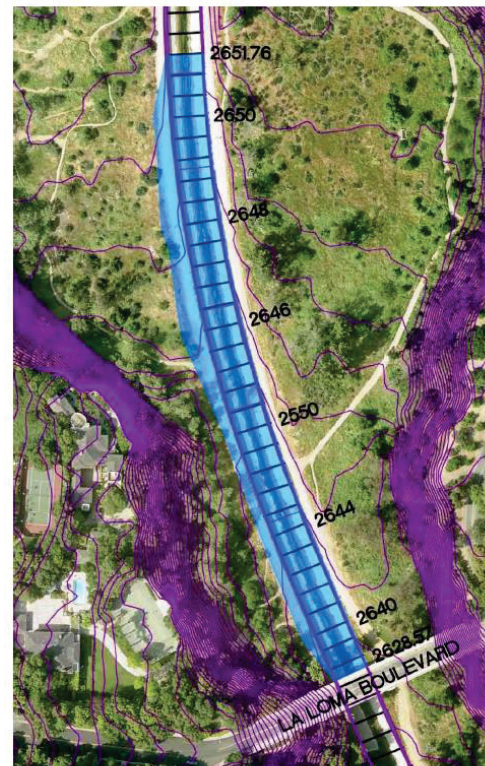


Figure 3-5: Area of Concern 4

Source: Bureau Veritas 2012

Area of Concern 5 is located in the vicinity of South San Rafael Avenue.

- San Rafael Creek Confluence
- Flood control requirements (channelized Arroyo Seco).
- Hydraulic analysis shows overtopping of channel.
- Steep erosive hillside on west bank
- Horse stables downstream
- Arroyo Seco Trail
- San Rafael Ave bridge

Potential impacts including flooding of adjacent residential streets and structures, as well as excessive overbank erosion and subsequent damage to the channel, may occur in this area during a Capital Storm Event.

3.6 Area of Concern 5: Sections 2573.52-2540

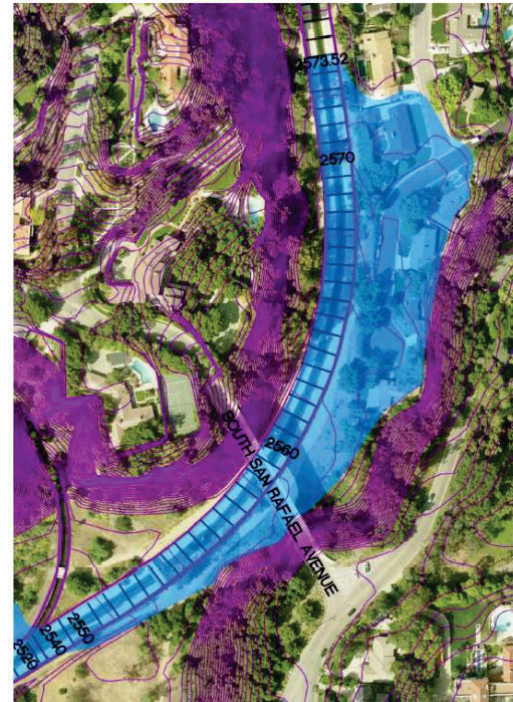


Figure 3-6: Area of Concern 5

Source: Bureau Veritas 2012

3 SAN PASCUAL STABLES AND ARROYO PARK

Location: City of South Pasadena

North of San Pascual Ave. and west of Arroyo Dr.

Land Use Designation: Parks and Low Density Residential

Zoning: Open Space (OS) and Residential Low Density (RS)

South of San Pascual Ave. and west of Arroyo Dr.

Land Use Designation: Parks

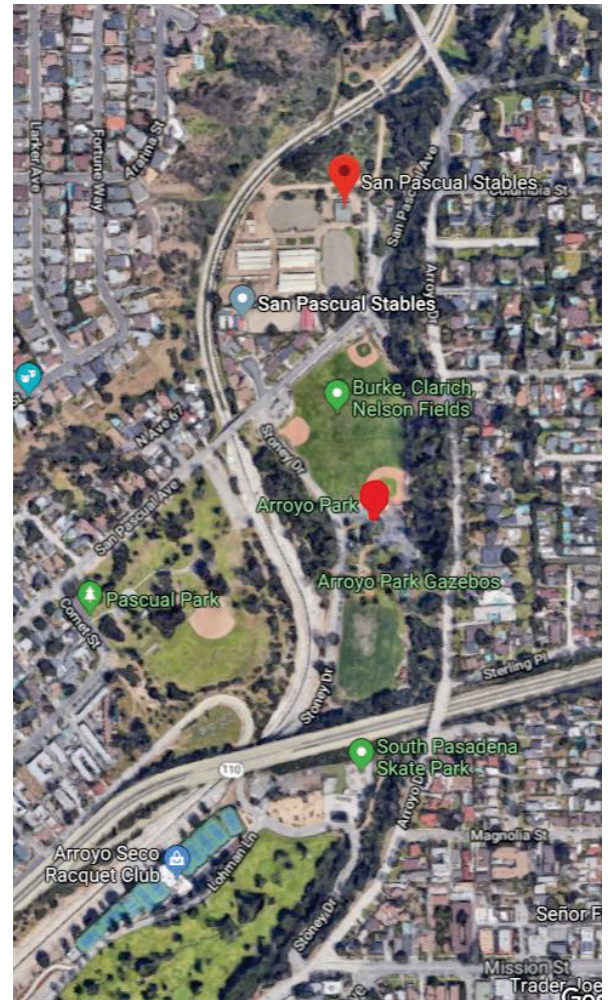
Zoning: Open Space (OS)

3.1 San Pascual Stables

San Pascual Stables are a public equestrian center on land leased by the City of South Pasadena. Evidence of point source pollution runoff from the stables has been observed. The stables are immediately downstream of the San Rafael Creek confluence with the Arroyo Seco and immediately upstream of Arroyo Park. The Arroyo Seco is constricted between the stables on the east bank and steep hillsides on West Bank. However, the channel itself can be improved for fish passage similar to LA River fish passage and habitat structures in design phase. Habitat on both sides of the channel can be restored.



Arroyo Seco at the San Pascual Stables looking upstream.
Source: Bureau Veritas 2012



Source: Google 2019

3.2 Arroyo Park and Historical Spring

The 19.9-acre Arroyo Park is located on the north side of the Pasadena 110 Freeway. Arroyo Park provides major lighted athletic fields for South Pasadena. Amenities include lighted athletic fields, playground equipment, and picnic areas. There are also included undeveloped lands, and a flood channel.

An equestrian/hiking trail is on the south and west perimeter of the park connecting to the Arroyo Park. Pascual Park, a Los Angeles City park, is opposite the Arroyo Seco from Arroyo Park.



Historic Spring outlet at Arroyo Park. Source: Bureau Veritas 2012

Near the Pasadena 110 Freeway bridge and Stoney Drive, a historical spring and wetland has been identified. The channel area is paved for local drainage purposes. There is significant non-native and invasive vegetation in the drainage adjacent to the Arroyo Seco that could be restored to a native stream and wetland system, along with naturalization of the Arroyo, reconnecting to this historical spring and provide for expansion of the Arroyo Seco floodplain.

The City of South Pasadena's Open Space and Resource Conservation Element of the General Plan identifies the polices for preservation of open space including the preservation of habitats that support diversity of wildlife species; encourage the preservation or creation of wildlife travel corridors; and control existing and future commercial development of parklands in the Arroyo Seco.

3.2.1 Potential Restoration Goals

1. Floodplain Restoration
 - a. Improve aquatic and riparian habitat value for native fish, birds and other native species by removing invasive vegetation and restoring native habitat (see below)
 - b. Provide local flood attenuation
 - c. No significant flooding risks and private property between San Pascual Stables and Pasadena 110 bridge. Great opportunity for removal of concrete and expansion of the floodplain into park areas without increase in flood risk. Flood

risk at historic stream (Area of Concern 7 below) is contained within existing topography.

2. Habitat Creation

- a. Create aquatic, riparian and/or wetland habitat where concrete is removed and the Arroyo channel is reconnected to floodplain
- b. Aquatic habitat for native fish including unarmored threespine stickleback, arroyo chub, trout/steelhead
- c. Riparian habitat for birds including California gnatcatcher, and yellow warbler and other wildlife (target species restoration)
- d. Align with regional biodiversity planning
- e. Restore native riparian habitat:

Arroyo Seco Habitat Types

- i. Live Oak Woodland – Coast live oak (*Quercus agrifolia*)
 1. Toyon (*Heteromeles arbutifolia*)
 2. Laurel sumac (*Malosma laurina*)
 3. Other oaks (*Q. berberidifolia*, *Q. engelmannii*)
 4. Poison oak (*Toxicodendron diversilobum*)
- ii. Alluvial Fan Scrub – Scalebroom (*Lepidospartum squamatum*)
 1. California sagebrush (*Artemisia californica*)
 2. Mulefat (*Baccharis salicifolia*)
 3. California buckwheat (*Eriogonum fasciculatum*)
 4. Deerweed (*Acmispon glaber*)
- iii. Mulefat scrub (*Baccharis salicifolia*) & Willow Scrub (*Salix* sp.)
 1. Arroyo willow (*Salix lasiolepis*)
 2. Gooding's willow (*S. gooddingii*)
 3. Red willow (*S. laevigata*)
 4. Coyote brush (*Baccharis pilularis*)
- iv. Sycamore Riparian Woodland – California sycamore (*Platanus racemosa*)
 1. White alder (*Alnus rhombifolia*)
 2. Southern California black walnut (*Juglans californica*)
 3. Cottonwood (*Populus fremontii*, *P. trichocarpa*)
 4. Willows (*Salix* spp.)
- v. Sage Scrub
 1. California buckwheat
 2. California sagebrush
 3. Black Sage (*Salvia mellifera*)
 4. White Sage (*Salvia apiana*)

3. Non-native Vegetation Removal

- a. Target Invasive Species
 1. Cape ivy (*Delairea odorata*)
 2. French Broom (*Genista monspessulana*)
 3. Giant reed (*Arundo donax*)
 4. Pampas grass (*Cortaderia selloana*)
 5. Spanish Broom (*Spartium junceum*)
 6. Tamarisk (*Tamarix ramosissima*)
 7. Common fig (*Ficus carica*)
 8. Fountain grass (*Pennisetum setaceum*)
 9. Mexican fan palm (*Washingtonia robusta*)
 10. Mustards (*Brassicacae*, *Hirschfeldia*, *Sisymbrium*)

11. Poison hemlock (*Conium maculatum*)
 12. Spurges (*Euphorbia sp.*)
 13. Sticky snakeroot (*Ageratina adenophora*)
 14. Tocalote (*Centaurea melitensis*)
 15. Tree of heaven (*Ailanthus altissima*)
 16. Tree tobacco (*Nicotiana glauca*)
 17. Periwinkle (*Vinca major*)
 18. Castor bean (*Ricinus communis*)
 19. *Eucalyptus sp.*
 20. Horehound (*Marrubium vulgare*)
 21. Milk thistle (*Silybum marrianum*)
4. TMDL Compliance Implementation
 - a. Evaluate and address other stables and related trash and waste draining to Arroyo Seco between San Rafael Creek and the Pasadena 110 Freeway that could be improved and retrofitted with BMPs. In addition, naturalization of the Arroyo Seco and historical spring will provide natural treatment of flows, including all Arroyo Seco flows upstream of this point.
 - b. Retrofit local drainage at the San Pascual Stables with BMPs to address potential point source pollution.
 5. Regional Trail Connectivity/River Greenway
 - a. Opportunity to connect to upstream trail networks.
 - b. Woodland and Wildlife Park Trails, new Arroyo Seco Bicycle and Pedestrian Path, and Arroyo Seco Bicycle Path.
 6. Sediment Management – subject of further study
 7. Groundwater Restoration Study
 - a. Assess groundwater/surface water interactions for San Rafael creek and other sites, reconnecting historic spring as a feature within restored Arroyo Seco floodplain.

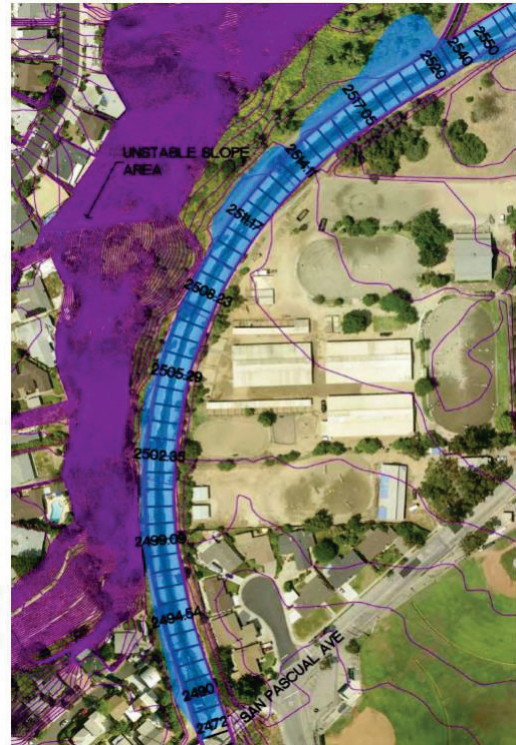
3.2.2 Hydraulic Study Information

Areas of Concern 6 is located immediately north of San Pascual Avenue at the San Pascual Stables.

- Existing landslide issue on the steep canyon wall on the right (west) bank
- Possible opportunity to remediate (slope stabilization, recontouring, revegetation, etc.).
- Alleviate future erosion concerns that could impact the Arroyo Seco channel and adjacent areas, as well as downstream flood and infrastructure risk.
- Create a multi-benefit project that would also minimize future slope instability issues that would otherwise continue to impact landowners on the right bank.
- Hydraulic analysis shows overtopping of channel.

While potential effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.7 Area of Concern 6: Sections 2540-2472.5



Source: Bureau Veritas 2012

Area of Concern 7 is located immediately north of the 110 Freeway adjacent to Stoney Drive.

- Location of Historic Spring
- Hydraulic analysis shows overtopping of channel.

While potential effects including excessive overbank erosion and subsequent damage to the channel may occur in this area during a Capital Storm Event, no significant flooding impacts are anticipated from this area of overtopping in its current condition.

3.8 Area of Concern 7: Sections 2392-2378.75



Source: Bureau Veritas 2012

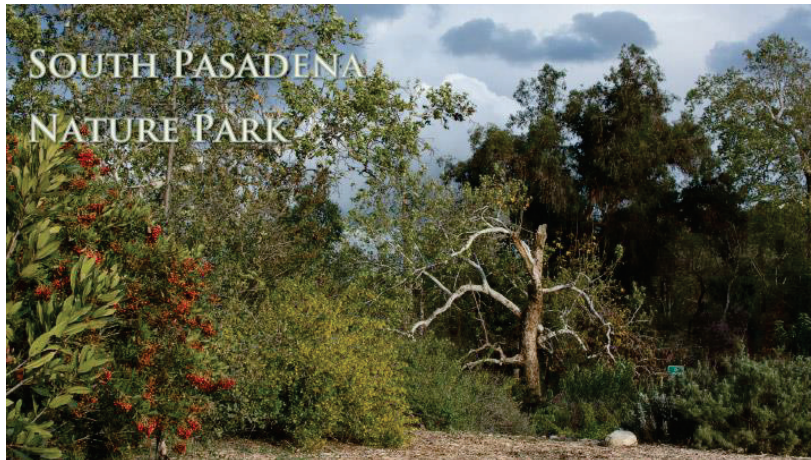
Figure 3-8: Area of Concern 7

4 ARROYO WOODLAND AND

WILDLIFE NATURE PARK

This three-acre park includes meandering trails among rarely see native California Walnut trees. The Woodland and Wildlife Park Trail begins at the park entrance and continues along the east side of the Arroyo Seco in South Pasadena. A lookout point located in the center of the park offers views of the historical York Boulevard Bridge, Mount Washington, the Verdugo Mountains, and the San Gabriel Mountains.

- This park could be used as a model for botanic design for the study area.



5 REFERENCE MATERIAL

- City of Pasadena Master Plans and related documents
- City of Pasadena's Green Space, Recreation and Parks Master Plan
- City of South Pasadena General Plan Land Use & Community Design Element
- City of South Pasadena General Plan Open Space & Resource Conservation Element
- Arroyo Seco Watershed Management & Restoration Plan, North East Trees
- Arroyo Seco Eco Restoration Feasibility Workshop, USACE
- Los Angeles River Ecosystem Restoration Integrated Feasibility Report, USACE
- Final Arroyo Seco Watershed Assessment, CDM
- Final Arroyo Seco Hydraulic Analysis, Bureau Veritas
- LAR Fish Passage Pilot
- Native Fish Recovery Workplan
- Bureau of Reclamation LAR fish passage report
- TMDL related studies