

**Agilent – Santa Clara
CO-3**

Site Location:

5301 Stevens Creek Boulevard
Santa Clara, CA

Features:

- Roof garden
- Disconnected downspouts

Stormwater Benefits:

- Reduced impervious surface area
- Reduced volume and velocity of runoff



Large areas of vegetation are located on top of the second floor of the office building.



Photograph above courtesy of Scott Sidlow (Agilent).

The roof garden is located on the second floor of the Agilent building.



Trees are planted as part of the roof gardens.

Agilent – Santa Clara
CO-3 (cont.)



Rooftop runoff is directed to drain through the vegetation.



Exhaust vents for HVAC* systems are integrated into roof garden areas.

*HVAC = heating, venting, and air conditioning



Photograph above courtesy of Scott Sidlow (Agilent)

Another view of the roof garden shows a large shady tree that can reduce rainfall velocity and runoff.

**Agilent – Santa Clara
CO-3 (cont.)**

Lessons Learned:

- Leakage occurred due to roots penetrating the roof membranes, however after patching the barriers underneath the garden, leakage was prevented.
- The membrane integrity was also compromised by heavy vehicle traffic (for deliveries to the café on the roof garden level). The amount of deliveries was minimized to prevent more leaks.

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Site Contact:

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**Juniper Networks
CO-8**

Site Location:

1194 N. Mathilda Avenue
Sunnyvale, CA

Features:

- Multi-story buildings reduce building footprint
- Rocky swales and trees in parking lot
- Rooftop runoff drains to landscaping
- Promotes alternative transportation
- Permeable pavement
- Located buildings to protect existing heritage tree

Stormwater Benefits:

- Reduced impervious surface area
- Reduced transportation-related pollutants
- Natural treatment of runoff
- Reduced volume and velocity of runoff
- Reduced directly-connected impervious area (DCIA)



Runoff from rooftop drains into landscaping reducing the directly-connected impervious area (DCIA).



This pathway made of pervious pavers allows infiltration through the sand filled crevices. Also, these benches are provided on pervious surfaces.



Parking lot runoff drains through curb cuts and then filters through the rocky swale. Trees provide visual amenities as well as reduce the volume and velocity of runoff.

**Juniper Networks
CO-8 (cont.)**



The convenience of the Light Rail Station across the street encourages employees to take public transportation to work.



Charging stations allow employees with electric vehicles, like the Sparrow pictured here, to charge-up while at work.



Plenty of carpool parking encourages employees to share rides to work.



Covered bike racks are provided for employees who prefer to ride their bicycles to work.

Juniper Networks CO-8 (cont.)



An existing oak tree was preserved in the development of this project.

Lessons Learned:

- During storms, ponding does occur in parking lots. This can be prevented through better design and construction of the rocky swales to ensure that the infiltration rate of the swale is fast enough to prevent ponding, or by adding a perforated drainage pipe for runoff overflow. It is also important that the site is graded properly to direct water toward the swale.

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Site Contact:

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Communications Hill/Helzer Ranch MF-1

Site Location:

3000 Narvaez Avenue
San Jose, CA

Features:

- Landscaped areas provide detention for floods and stormwater
- Downspouts disconnected
- Higher density housing

Stormwater Benefit:

- Reduced impervious surface area
- Reduced directly-connected impervious area (DCIA)
- Natural treatment of runoff
- Reduced velocity runoff



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Rooftop runoff drains through downspouts to landscaping for treatment and infiltration.



Photograph courtesy of Jenny Nusbaum (City of San Jose)

This large grassy swale provides area for runoff to percolate into the soil, reduce downstream peak flows, and to receive treatment via settling and filtration.

**Communications Hill/Helzer Ranch
MF-1 (cont.)**



Photograph courtesy of Jenny Nusbaum (City of San Jose)

This outdoor space for the community to enjoy also acts as a detention basin for stormwater.



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Infiltration is allowed to occur in this detention basin before entering the drainage system.

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Site Contact:

Matt Steinle
Development Director
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**Stanford West
MF-3**

Site Location:

700 Clark Way (off Sand Hill Road)
Palo Alto, CA

Features:

- Apartment development was planned with cul-de-sacs, but redesigned to use a grid system
- Area dedicated as a covered car wash area plumbed to the sanitary sewer
- Detention basin on the east end that also serves as a recreational playing field



Photograph courtesy of Joe Teresi (City of Palo Alto)

This covered car-washing area drains water to the sanitary sewer system. This prevents car wash water, soap, and pollutants from entering storm drains.

Stormwater Benefit:

- Washwater treatment
- Natural treatment of runoff in recreational area
- Reduced velocity of flows discharged to nearby creek
- Transportation-related pollution reduction (grid street system reduces vehicle miles traveled)



Photograph courtesy of Joe Teresi (City of Palo Alto)

A recreational play field also serves as a detention basin for runoff. The detention basin temporarily holds runoff, allowing for settling, infiltration and pollutant removal to occur, such as allowing fine sediments to settle out. The system releases runoff slowly to reduce downstream peak flows.

Municipal Contact:

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**Ryland Mews
Transit-Oriented Development Corridor
MF-4**

Site Location:

4115 North 2nd Street
San Jose, CA

Features:

- High density housing near First Street Light Rail Line
- Located near downtown
- Disconnected downspouts drain to landscaping
- Multi-story buildings reduce the building footprint



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Light Rail runs nearby, promoting the use of alternative transportation. Motor vehicles can be the sources of metals, oil, and grease which can be harmful to aquatic organisms and, in high enough quantities, can contaminate drinking water supplies. (BASMAA, 1999) Using alternate transportation can reduce the amount of these pollutants from entering waterways.

Stormwater Benefits:

- Reduced impervious surface area
- Reduced directly-connected impervious area (DCIA)
- Transportation-related pollution reduction



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Open space surrounding high density housing allows residents to enjoy the outdoors (e.g., grass and trees) and also provides good drainage areas.

**Ryland Mews
Transit-Oriented Development Corridor
MF-4 (cont.)**



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Rooftop runoff drains through downspouts to landscaping where it has the opportunity to be filtered by plant material and infiltrate into the soil. Disconnecting impervious surface area reduces the speed and amount of water which can result in benefits such as lower peak flows downstream and reduced flood and erosion potential.

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Barry Swenson Builder

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The Crossings MU-1

Site Location:

2255 Showers Drive
Mountain View, CA

Features:

- High density (multi-story) housing with reduced building footprints integrated with commercial areas
- Located near mass transit including bus lines and CalTrain station
- Disconnected downspouts drain into landscaping
- Turf block fire lanes
- Landscaped center of driving circle

Stormwater Benefits:

- Transportation-related pollutant reduction
- Reduced impervious surface area
- Reduced velocity of runoff
- Reduced directly-connected impervious area (DCIA)
- Natural treatment of runoff



“The Crossings” is conveniently located across the street from the San Antonio CalTrain Rail Station.



Turf block fire lane provides access during emergencies. The bollards can be removed for emergency access.

**The Crossings
MU-1 (cont.)**



Multi-story housing reduces the building footprint and, thus, impervious surface area. Rooftop runoff drains into landscaping rather than directly to the storm drain system.



This rain gutter drains into landscaping reducing the amount of directly-connected impervious area (DCIA).



Drive around circle has a landscaped island, providing an area for infiltration.



The Crossings is located within walking distance to major commercial areas for groceries and other shopping needs, thereby reducing the need for auto use.

The Crossings MU-1 (cont.)



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Mixed use commercial businesses located within the Crossings encourage residents to walk to shops thereby reducing the reliance on motor vehicles.

Other Opportunities:

- To improve the site design from a stormwater quality perspective, the island could have been designed to accept runoff from the street through such features as concave landscaping with pavement protection, curb cuts, and grading the street to drain to the island.

**Santa Clara Valley Water District Headquarters
PA-1**

Site Location:

5700 Almaden Expressway
San Jose, CA

Features:

- Parking lot swales
- Rooftop downspouts drain to landscaping
- Multi-story building allows reduced building footprint

Stormwater Benefits:

- Reduced impervious surface area
- Reduced directly-connected impervious area (DCIA)
- Natural treatment of runoff



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Rooftop runoff drains to landscaping, breaking up directly-connected impervious area (DCIA).

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Photograph courtesy of Jenny Nusbaum (City of San Jose)

Multi-story building allows room for ample landscaping onsite for rooftop drainage and aesthetics.



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Vegetative swales within the parking lot collect drainage through curbside gaps. Concrete curb protects asphalt.

Site Contact:

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Swale Vegetation Contact:

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Santa Clara Valley Water District
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**West Valley Branch Library
Green Building
PA-2**

Site Location:

1243 San Tomas Aquino Road
San Jose, CA

Features:

- Green building based on United States Green Building Council and Leadership in Energy and Environmental Design rating
- Decomposed granite used for pedestrian paved areas

Stormwater Benefits:

- Reduced impervious surface area
- Reduced directly-connected impervious area (DCIA)
- Natural treatment of runoff



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Ample landscaping onsite allows for infiltration of rooftop drainage.



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Rooftop runoff drains to downspouts that drain to landscaping reducing directly-connected impervious areas (DCIA).



Photograph courtesy of Jenny Nusbaum (City of San Jose)

Pedestrian walkway created with decomposed granite.

**Valley Branch Library
Green Building
PA-2 (cont.)**



Site and Municipal Contact:

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This artichoke fountain serves as an aesthetic drainage conduit for rooftop runoff to the storm drain system.

Other Opportunities:

- Instead of leading directly to the storm drain system, fountains could be designed to recirculate the water, or to drain to landscaping surrounding the fountain to disconnect impervious surface areas.

Hewlett Packard Garage CO-18

Site Location:
367-369 Addison Ave.
Palo Alto, CA

Stormwater Benefits:
Natural treatment of runoff
Reduced impervious surface area

Features:

- Pervious concrete driveway



Pervious concrete allows stormwater to infiltrate into soil and reduces impervious area.



Close-up of pervious concrete

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Concrete Subcontractor:

**Central Concrete (John
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Project Architect:

**Montgomery Anderson, Cody-Anderson-Wasney
Architects**
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Starbucks / Taco Del Mar
CO-17

Site Location:

361-365 California Ave.
Palo Alto, CA

Features:

- Disconnected downspouts drain to pervious area
- Permeable pavers used for front dining area and rear parking area
- Covered dumpster



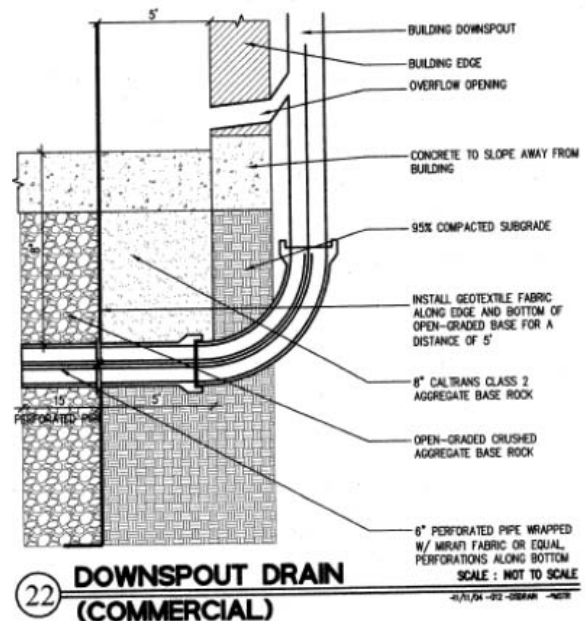
Permeable pavers were installed in the seating plaza in front of the restaurants. Permeable pavers allow storm runoff to infiltrate into the soil and reduce the amount of impervious surface.



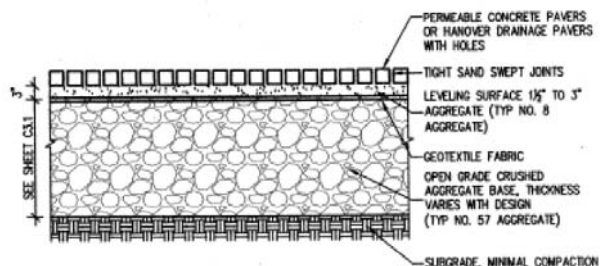
Close-up of permeable pavers.

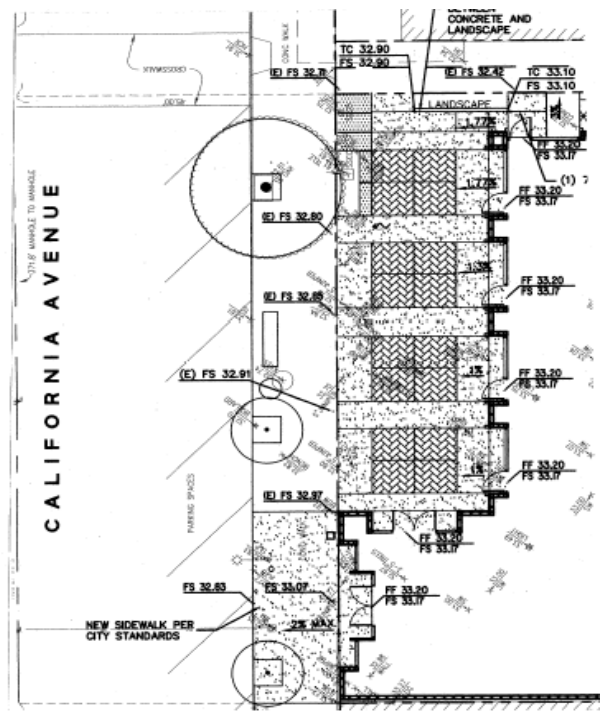
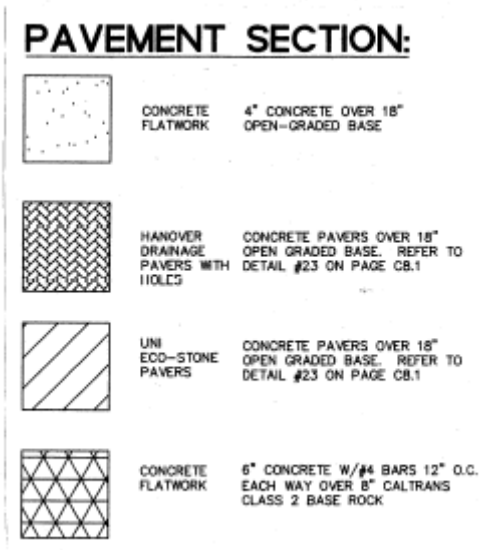
Stormwater Benefits:

- Natural treatment of runoff
- Reduced directly-connected impervious area (DCIA)
- Reduced impervious surface area
- Prevent stormwater from coming into contact with pollutants



The rainwater leaders from the building roof are routed directly into the reservoir of open-graded rock beneath the permeable pavers to allow for further infiltration of site runoff. There is an overflow to the gutter to drain the reservoir during larger storm events.





Site plan of 361 California Avenue



Covered trash enclosure reduces the potential for stormwater to come into contact with pollutants.

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Project Engineer:
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**Willow Glen Reflections
MF-9**

Site Location:

1528 Willowbrae Avenue
San Jose, CA

Features:

- Dry Exfiltration Basin
- Landscaped Infiltration Areas
- Disconnected Downspouts
- Multi-Story Building
- Shared Driveway

Stormwater Benefits:

- Natural treatment of runoff
- Reduced volume and velocity of runoff
- Reduced directly-connected impervious area (DCIA)
- Reduced impervious area



Top view of dry exfiltration basin



Dry exfiltration basin is hydraulically sized to detain and treat all site runoff.



Shared driveways and multi-story buildings reduced overall site impervious area.



Roof leaders flow to landscaped areas to reduced directly-connected impervious areas and naturally treat runoff.

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