Efficient By Design

LID and a Biological Approach to Stormwater Management

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Overview

LID overview

Native Grasses & Turf Alternatives

Sample Projects

Low Impact Development

- Soft engineering approach to stormwater management
- LID captures and cleans polluted runoff on site through a series of treatment landscapes
- Recharges groundwater
- Goal of LID is to maintain projects's pre-development hydrology

Hard Engineering

- Mechanical
- Drain, Direct, Dispatch
- Flow Control, Detention, Retention

Soft Engineering

- Biological
- Slow, Spread, Soak
- Filtration, Infiltration, Treatment

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What is a Bioswale?

Defined: An open, gently sloped, vegetated channel designed for treatment and conveyance of stormwater runoff.

Typical Bioswale

The Cannery's *bioswales* are broad, shallow channels with dense vegetation covering the side slopes which provides filtration and reduces flow velocities as the runoff is conveyed through the system. These swales function as part of the stormwater conveyance system and can potentially reduce the need for curbs, gutters and storm drains.

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What is a Bioswale?

Central Greenbelt

The Cannery's *Central Greenbelt serves as the main north-south path of travel for pedestrians and bicyclists. The +/- 80-foot easement contains a 10-foot multi-use trail along with numerous 5-foot walks connecting to residences and the outer network of paths. Public gathering areas and green spaces will encourage pedestrian circulation through the core of the neighborhood. Bio-swales of different shapes and sizes will be contained within the easment, gathering and treating stormwater runoff before being sent to the outer basin.*

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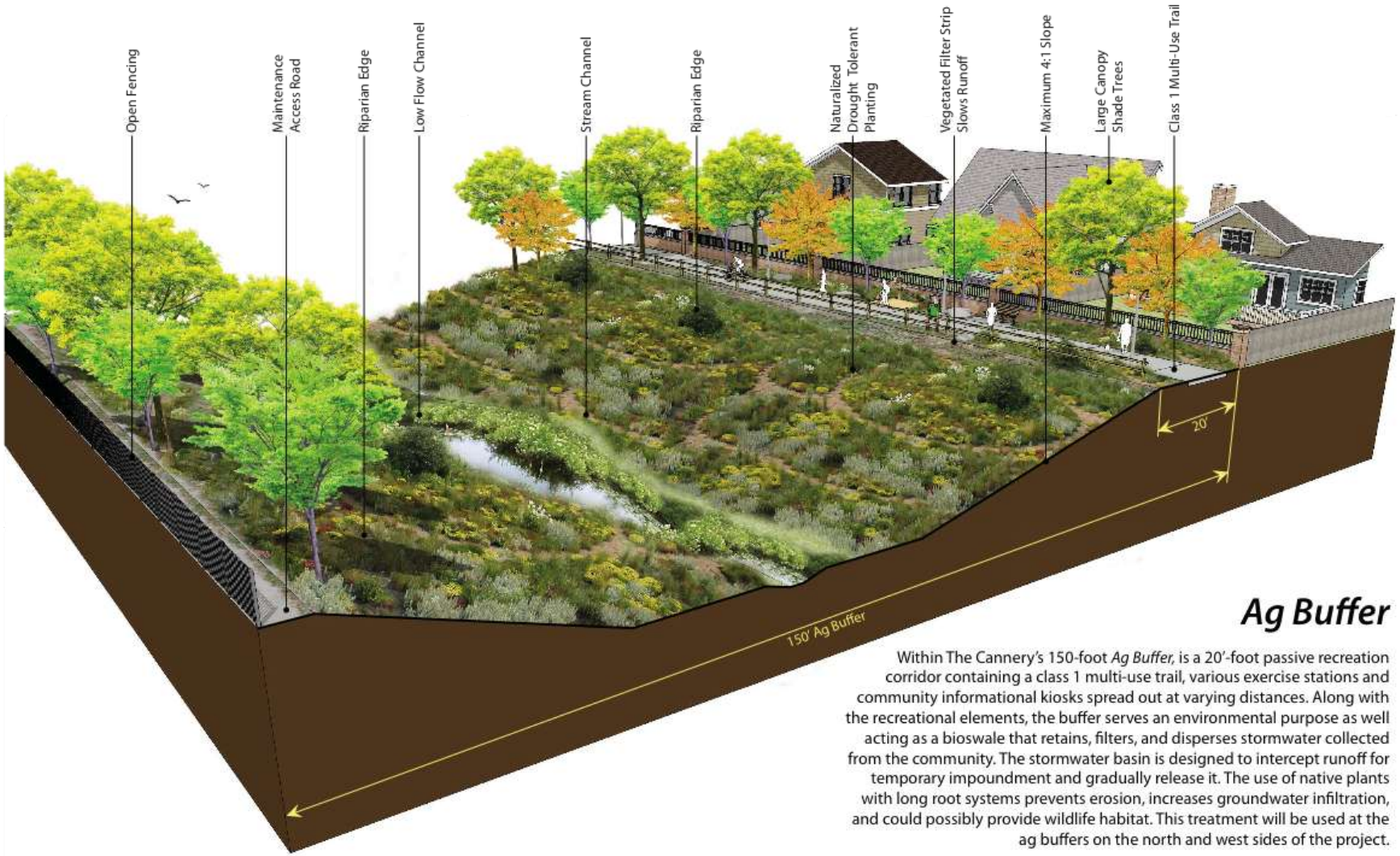
What is a Bioswale?



Ag Buffer

Within The Cannery's 150-foot *Ag Buffer,* is a 20'-foot passive recreation corridor containing a class 1 multi-use trail, various exercise stations and community informational kiosks spread out at varying distances. Along with the recreational elements, the buffer serves an environmental purpose as well acting as a bioswale that retains, filters, and disperses stormwater collected from the community. The stormwater basin is designed to intercept runoff for temporary impoundment and gradually release it. The use of native plants with long root systems prevents erosion, increases groundwater infiltration, and could possibly provide wildlife habitat. This treatment will be used at the ag buffers on the north and west sides of the project.

Landscape Function:

Phytoremediation

- Extraction of Pollutants from soil
- Root Storage
- Biochemical Breakdown
- Absorbed as nutrients

Native Grasses

- Low Water Use
- Deep Root Systems
- Increase Groundwater infiltration

Native Sod

- Limited Variety
- Installation timing is crucial
- Good for small areas
- Great for limited maintenance contracts (120 days or less)

Plugs

- Great selection
- Timing is critical
- Great for limited maintenance contracts (120 days or less)
- Contract grow recommended (ideally 1 year in advance of planting)

Seeding

- Good for large areas
- Drill seeding is preferred – with correct equipment
- October-April
- Specify seed from same eco-type: advance collection is required.

Seeding

- Minimum 2-year establishment with extensive labor.
- Results not fully apparent for 2 years.
- Hydroseeding is possible, though not preferred. Use a two-step process in which all the seed is applied first, then mulched.

Native Grass: specifications

- Source quality control
- Installer qualifications / training
- Maintenance duration
- Performance requirements for acceptance
- Maintenance activities:
    - Mowing (early first and second years)
    - Controlled burn (late second season)
    - Selective chemical control
    - Hand-weeding

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Native Grass: specifications

Image credit: http://www.tio.co.uk

Native Grass: cover crops

- Creeping Wildrye
  Leymus triticoides

- California Meadow Barley
  Hordeum brachyantherum ssp. 'californicum'

Native Grass: Bunch type

- Idaho Fescue
  Festuca idahoensis
- Deer Grass
  Muhlenbergia rigens

Native Grass: Bunch type

- Purple Needlegrass
  Nassella pulchra
- Nodding Needlegrass
  Nassella cernua
- Maidenhair Grass
  Deschampsia cespitosa
  'Northern Lights'

Native Grass: Sedges

- Pacific Dune Sedge
  Carex pansa
- Clustered field sedge
  Carex praegracilis
- Santa Barbara Sedge
  Carex barbarae
- San Diego Sedge
  Carex spissa

(Harder to establish from seed, plugging recommended.)

Native Grass: Rushes

- Soft Rush
  Juncus effusus
- **California Grey Rush**
  Juncus pattens

(Harder to establish from seed, plugging recommended.)

Native Grass: Sources

Hedgerow Farms

21905 County Road 88
Winters, CA 95694-9059
(530) 662-6847

John Anderson

Larner Seeds

Shop & Demonstration Garden

235 Grove Road
Bolinas, CA 94924

Pacific Coast Seed

533 Hawthorn Pl
Livermore, CA 94550-7190
(925) 373-4417

David Gilpin

More information

California Native Grasslands Association, www.cnga.org.

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Native Grass: Creekside Linear Park

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Native Grass: UCD Winery, Brewery, Food Pilot Facility

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Native Grass: UCD Winery, Brewery, Food Pilot Facility

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Native Grass: UCD Brewery, Winery, Food Pilot Facility

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Native Grass: UCD Brewery, Winery, Food Pilot Facility

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Native Grass: FRWA Intake Facility

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Native Grass: I-5 Freeway Buffer

"Sustainability is…meeting the needs of the present without compromising the ability of future generations to meet their own needs."

World Commission on Environment and Development

Applicability:

- Applies to projects “constructed” Jan. 1, 2010 or after.
- Applies to parks except recreation areas.
- Applies to all model homes.
- Applies to new commercial/developer/homebuilder installed landscapes 2,500 sf or more and requiring a permit.
- Applies to new homeowner-installed landscapes 5,000 sf or more and requiring a permit.
- Enforced by local jurisdictions, which may designate some portions of review to water agencies.

AB 1881: Model Water Efficient Landscape Ordinance

Notable Requirements:

- Prohibits overhead irrigation within 24” of hardscape.
- Prohibits overhead irrigation of irregular or narrow (8’) areas.
- Requires low volume irrigation in all mulched planting areas
- Requires low precipitation (<.75 in/hr.) irrigation on slopes greater than 25%.
- Requires ET-based “SMART” controllers (or soil moisture sensors)
- Requires Soil Management Report & Grading Plan
- Requires planting and irrigation based on plant water demands (hydrozones).
- Requires Irrigation Audit with Cert. of Completion.

Evapotranspiration Adjustment Factor (EATF):

- ETAF is the Plant Factor (PF) / Irrigation Efficiency (IE)
- Plant Factor hasn't changed, still .5 (lower side of average)
- Irrigation Efficiency changed from .625 to .71, due to advances in irrigation technology and design.
- AB 1881 changes ETAF from .8 to .7
- Special Landscape Areas (SLA's) have an ETAF of 1.0. SLA's include all areas using recycled water, edible gardens, and turf for active playing surfaces.