BIRNIE PARK

The **Birnie Park Green Infrastructure Project** was completed in September 2017 with grant assistance from Oregon State University, Oregon Department of Forestry and the U.S. Forest Service. Project goals include:

- Reduce water quality impairments downstream;
- Improve on-site flood control;
- Prevent site degradation and erosion;
- Beautify the landscape; and,
- Increase access/connectivity to Birnie Park.

Three city departments – planning, parks and recreation, and public works – collaborated on this project, learning from one another throughout the process. The planning process began in early 2016 and over 18 months the project team converted a degrading and eroding hillside in to a scenic and functional park amenity.

Several best management practices(BMPs) were incorporated into the project including construction sequencing, conserving fast(er) draining soils, tree protection, tree planting, vegetated filter strip and most prominently a water quality conveyance swale (see Figures 1-3 below). Multifunctional projects like Birnie Park are what makes the City of La Grande a regional leader in stormwater management.

Vegetated Filter Strip

Figure 1.This vegetated filter strip receives sheet flow from a street and slowly directs runoff into a perforated pipe which then connects to the water quality conveyance swale.

Water Quality Conveyance Swale

Figure 2. Sheet flow runoff is received from the road above and conveyed through a series of vegetated swales and pipes before ultimately discharging to a catch basin. An overflow pipe from a ravine is also connected to the system for additional capacity during high rain events.

Tree Planting

Figure 3. The concept of **"**Right tree, right place" led arborist Teresa Gustafson to border the site with a row of river birch (*Betula nigra*).

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Cost: $25,600.00
Length of project: 18 months
Contractor: City of La Grande Public Works, Parks and Recreation

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Prepared with assistance from: Kyle Carpenter, City of La Grande
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Teresa Gustafson, City of La Grande

COLLABORATION

Pictured above Stu Spence (Parks & Recreation Director), Kyle Carpenter (Environmental/Regulatory Superintendent), Teresa Gustafson (City Arborist).

Lessons Learned

Developing Expertise

Proposing a water quality conveyance swale was a new concept that required patience, compromise and clear direction. The benefits of slowing and filtering stormwater with vegetation required a shift away from conventional stormwater management. For example, road professionals are accustomed to channelizing stormwater in pipes and gutters. Over the course of the project team members began to understand the concept and offered creative solutions such as connecting the vegetated filter strip to the water quality conveyance swale.

Interdisciplinary Collaboration

Collaboration between three city departments was necessary to make this project happen. Staff found that green infrastructure projects require a common language. Over the course of the project team members began to define and explain unfamiliar terms, SUCH AS… to one another, addressing communication barriers in the process.

These interdisciplinary interactions also enhanced the working relationships across departments. Departments now have better understanding of one another's role and can better anticipate design challenges.

Meeting Management

Hosting a few large project meetings at the site throughout the duration of the project proved to be an efficient way to communicate challenges and propose solutions.

Information Management

The project team inherited a site with limited documented history. This experience revealed opportunities to better track the city's infrastructure for future development and retrofit projects like this one.

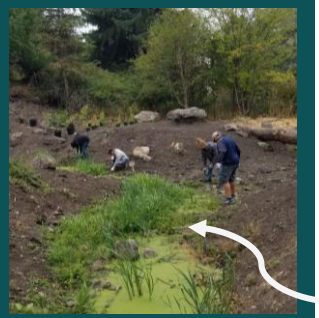
Site Challenges

… where is the water going?

A natural spring at the bottom of the hillside periodically caused flooding to the park and neighboring property. From a drainage standpoint this made the site challenging to grade. In certain areas across the site the drainage had been found to be sloped away from the outflow which only made flooding issues worse.

In the end, the project team decided to work with the site's natural features. The water quality conveyance swale is designed to function with the capacity to receive additional water from a natural ravine as well as naturally pond in the saturated areas near the spring.

Water, whether it be stormwater runoff or spring water, enters the facility that is designed to slow, convey, treat, and infiltrate water, mimicking the natural water cycle.



Added Value Benefits

In addition to the water quality and water quantity benefits the green infrastructure facilities provide, they also add value to the site in other ways.

Aesthetics
This hill used to be an eyesore, now it is focal point of the park.

Community Identity
Residents and visitors now have greater access to the historically significant park with the new gravel pathway.

Public Health
BMPs implemented on the site improve air quality, livability, and groundwater quality, all factors directly tied to human health.

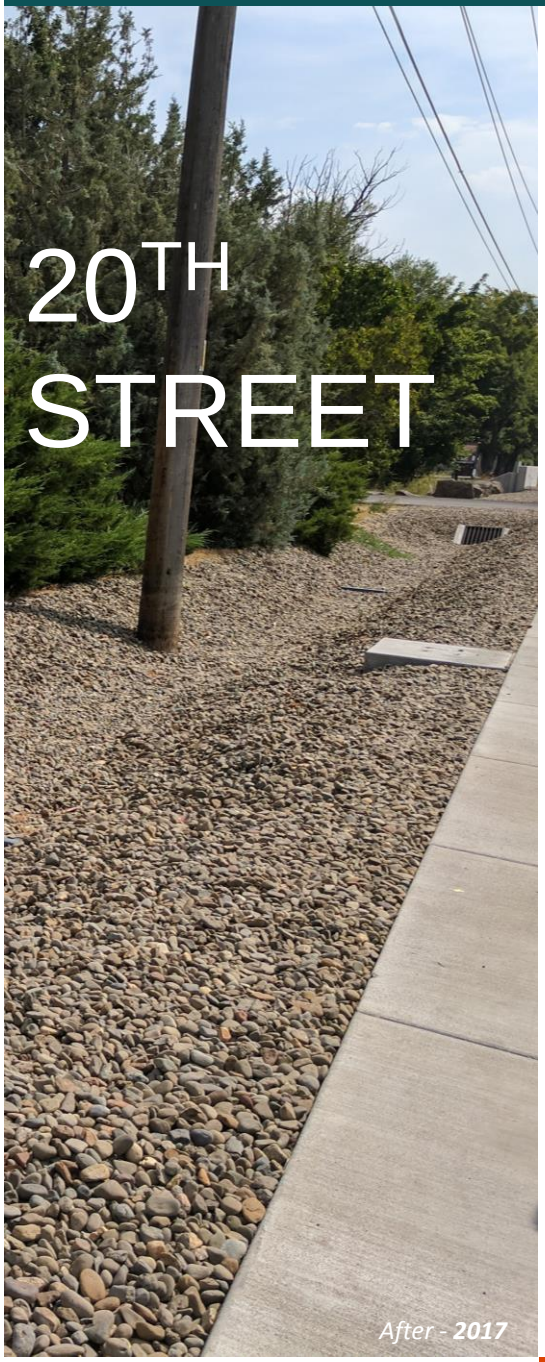
Planting Native

The project team invested in the site by selecting native plants which will be more tolerant of the semi-arid climate and soil conditions thus requiring less maintenance.

- Ninebark (*Physocarpus opulifolius*)
- Dogwood (*Cornus florida*)
- Chokecherry (*Prunus virginiana*)
- Scoulers willow (*Salix scouleriana*)
- Elderberry (*Sambucus nigra*)
- Serviceberry (*Amelanchier alnifolia*)
- Snowberry (*Symbhoricarpos albus*)
- Alder (*Alnus rubra*)
- Gold current *(Ribes aureum)*
- Wax current (*Ribes cereum*)
- Mock orange (*Philadelphus virginalis*)
- Water birch (*Betula occidentalis*)
- Rocky mountain maple (*Acer glabrum*)
- Roses (*Rosaceae)*

A seed mix of Idaho fescue, blue bunch grass and blue flax was spread along the ditch banks to establish ground cover alongside plants that do well in saturated soils, such as sedges.

20TH STREET



The **20th Street Reconstruction Project** was completed in May 2016 after the City of La Grande received funding from Oregon Department of Transportation to address poor road conditions and improve site functionality. As a main access road to the downtown center, 20th street boarders the commercial and residential zones for the city, making it an ideal project to add sidewalks and bike lanes and increase livability.

The design team installed three low impact development (LID) swales to capture stormwater runoff from the street and sidewalk. These swales receive surface runoff from a storm drain that is then conveyed through the series of gravity-fed swales.

An LID swale is a *depression in the ground that reduces runoff volumes and pollution levels in stormwater runoff*. Water directed to these facilities is treated through ponding and infiltration, filtration and evaporation. These LID swales were designed to infiltrate and filtrate through several different mediums (see Figures 1 & 2 below). After dispersing through 18" of water quality mix and backfill, water reaches a 6" perforated pipe which acts as an underdrain to the swale. Underdrains are often used in slow draining soils in order to prepare for frequent rain events.

Low Impact Development (LID) Swale

Swale No. 2 (pictured left and illustrated below)

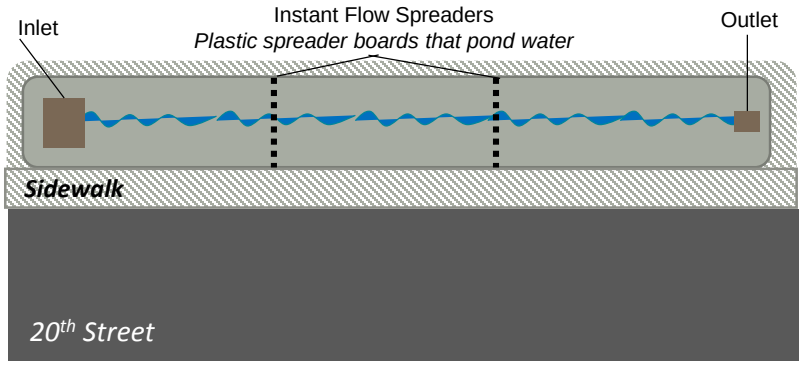


Figure 1. As stormwater flows through the swale, the flow spreaders, (sometimes called check dams) will act as ponding agents, slowing the release of water. The flow spreaders have a 1" maximum exposure over the bottom of the swale and are secured with stakes.

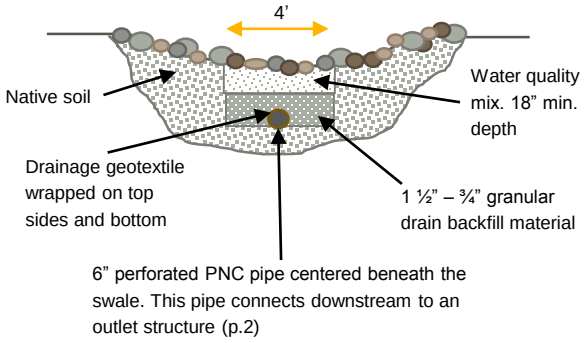


Figure 2. Cross section of the LID swale. Side slopes are less than 33% (3 horizontal to 1 vertical).

MISSED OPPORTUNITIES **Vegetation.** Plants, soil and soil microbes do an excellent job of breaking down pollutants, water quality would be further improved with vegetation. Maintenance was likely a key factor when making the decision to use rocks rather than vegetation. **Geotextile.** The geotextile fabric wrapped around the pipe may get clogged and prevent water from reaching the pipe when high rainfall events occur. Removal of the fabric, and the pipe below it, would provide more water quality benefits. Even with these missed opportunities, the series of swales still offer more water quality benefits than conventional stormwater management practices.

Cost: $2.4 Million
Contractor: Mike Becker Construction
Engineer: Anderson Perry & Associates, Inc.

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Oregon State University

WATER QUALITY IMPROVEMENT

Pictured above Kyle Carpenter (Environmental/Regulatory Superintendent) showing where the LID swale outflows into Gekeler Slough.

Site Challenges

Protecting urban water resources.

While the primary focus of the project was to improve drainage, connectively, and road conditions, the city was also able to improve water quality to an impaired urban stream.

Gekeler Slough is the urban creek that ultimately receives stormwater from the LID swales. The project improved fish passage and some effort was made to restore the creek to quality habitat.

Lessons Learned

The More the Merrier

Multifunctional roadside projects can offer communities a significant amount of social, economic and environmental benefits. While the project was focused on road improvement it delivered many tangible benefits.

Pairing green infrastructure BMPs with road projects is a great way to start or expand stormwater infrastructure.

Long term Project Planning

The storm sewer main was constructed over a two-year period and the bridge structure was installed one year before the roadway was constructed. Making sure that the elevation of the sewer and the bridge were set to work with existing design grades required foresight and solid project planning.

Do your homework

Project leaders were unaware of the sensitive species potentially impacted by the project. As part of the project the bridge (pictured above and discussed further in the *site challenges* section) was designed to provide better fish passage.

Added Value Benefits

In addition to the water quality and water quantity benefits the green infrastructure facilities provide, they also add value to the site in other ways.

Habitat
Cleaner waters lead to healthier habitats for aquatic and riparian species. The new soil also provides habitat for soil microbes.

Community Identity
Sidewalks on either side of 20th street improve safe routes to pedestrians. Bike lanes were added along either side of the street to allow for better connectivity.

Public Health
BMPs implemented on the site improve livability and groundwater quality, two factors directly tied to human health.

The Adams Avenue Streetscape Project is a multiphase improvement project that began in 2012. Street tree removal and replacement was one aspect of the plan, replacing eight failing street trees with a diversity of new street trees in improved tree wells (Figure 1). A variety of cultivars that maintain a fairly narrow crown were selected to avoid conflicts with buildings, signs, and light posts.

Adding street trees to a downtown corridor can make a powerful statement and worthwhile investment if the right tree and tree well design are selected. Unit pavers were placed overtop the root system to provide a permeable yet sturdy walking surface.

Street Tree List

Armstrong Gold Maple (*Acer ruburm*)

Emerald Avenue Hornbeam *(Carpinus betulus)*

Princeton Sentry (*Ginkgo biloba*)

Pink Flaire Cherry (*Prunus sargentii)*

Chanticleer Pear (*Pyrus Calleryana*)

Crimson Sprire Oak *(Quercus robur x Q alba)*

Emerald Sunshine Elm (*Ulmus propinqua)*

Musashino Zelkova (*Zelkova musashino)*

Tree Planting

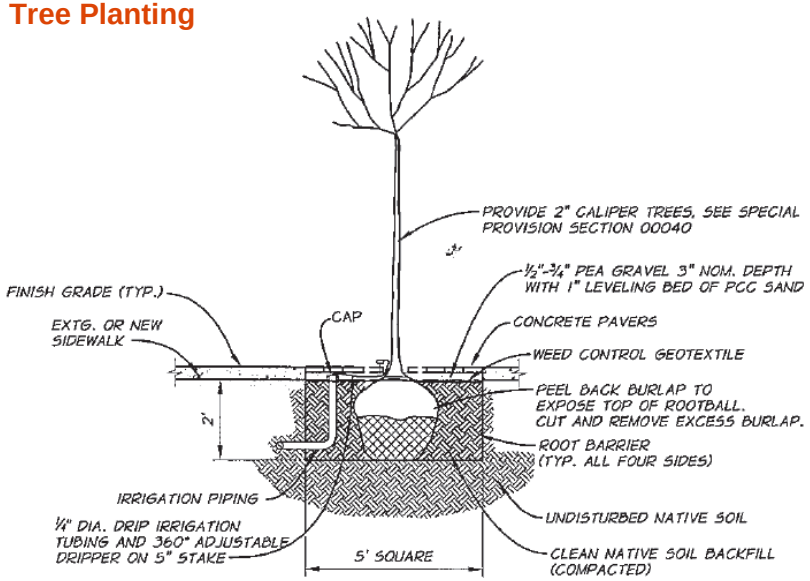

Figure 1. The generously sized tree wells offer trees 50 cubic feet of soil volume.

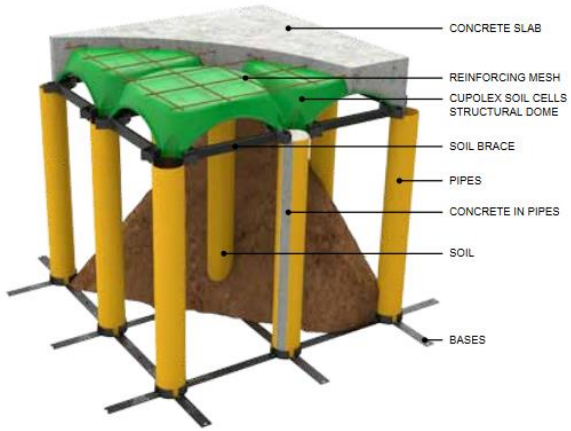

Figure 2. New urban tree technologies, such as the CUPOLEX® SOIL CELLS shown above, provide trees a more robust growing environment than traditional tree wells by giving the roots enough non-compacted soil volume to properly grow. These systems can also be designed to provide water storage. www.cupolex.com

Oregon State University

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