

# City of Bend

## Water Advisory Group



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**Location:** Hybrid Meeting

**In-person:** City of Bend Water Services Department, Deschutes Conference Room,  
62975 Boyd Acres Road

**Online:** [Microsoft Teams Meeting Link](#)

**Date:** January 8, 2024

**Time:** 11am-12:30pm

**Speakers:** Lori Faha, City of Bend Environmental Resources Manager  
Austin Somhegyi, Stormwater Master Plan Project Manager  
Trista Kobluskie, Stormwater Master Plan Consultant Lead  
Aubrie Koenig, Facilitator

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### Meeting Agenda

**Purpose:** Discuss potential strategies to address drainage and development density.

1. **Welcome & Introduction – 5 mins**
2. **Stormwater ‘Drainage & Density’ Policy Discussion – 75 mins**
  - a. Introduce stormwater considerations given development infill (see attached background)
    - MS4 permit requirements
    - Development trends (smaller lots, less space for natural systems, redevelopment)
    - Summary of previous WAG/UPAG/SPAG related discussions
    - Stormwater Master Plan policy opportunities
    - Definitions (onsite, regional, public, private)
  - b. Which tools for which development types
    - Discuss different types/sizes of development and which stormwater management methods could/should apply
  - c. Discussion questions:
    - What are your concerns about drainage and development density?
    - What new tools could be effective to help manage stormwater with smaller lot sizes and less available vegetated area?
    - Should there be options for combining private and public stormwater, and who should pay & maintain them?
3. **Summary & Closing – 5 mins**

# WAG Meeting Roadmap *draft*



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<b>February 5, 2025</b> 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	<b>FEB 2025 WAG MEETING: Stormwater Master Plan Project Priorities</b> <ul style="list-style-type: none"><li>Summarize results from draft CIP prioritization</li></ul> <b>Outcome:</b> <i>Feedback on project prioritization 'tie breakers.'</i>
<b>March 5, 2025</b> 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	<b>MARCH 2025 WAG MEETING: Water Conservation Program Performance Measures</b> <ul style="list-style-type: none"><li>Describe current program metrics</li><li>Summarize analysis to select program focus areas &amp; metrics</li><li>Discuss potential priorities for 2025</li></ul> <b>Outcome:</b> <i>Understanding of how water conservation benefits are measured.</i>
<b>April 2, 2025</b> 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	<b>APRIL 2025 WAG MEETING: Water Conservation Marketing &amp; Customer Class Water Use Goals</b> <ul style="list-style-type: none"><li>Discuss program marketing</li><li>Discuss water use goals by customer class</li></ul> <b>Outcome:</b> <i>Input on key program messaging and performance metrics.</i>
<b>May 7, 2025</b> 11am-12:30pm Hybrid: in-person at City Boyd Acres site or virtual on Teams	<b>MAY 2025 WAG MEETING: Draft Stormwater Master Plan &amp; Stormwater Standards Updates</b> <ul style="list-style-type: none"><li>Share overview of draft Stormwater Master Plan</li><li>Discuss updates to stormwater standards</li></ul> <b>Outcome:</b> <i>Feedback on master plan and new standards.</i>
<b>June 2025</b>	<b>Field Trip</b>



## Accessible Meeting Information

This meeting/event location is accessible. Sign language interpreter service, assistive listening devices, materials in alternate format such as Braille, large print, electronic formats, or any other accommodations are available upon advance request. Please contact Lori Faha at [lfaha@bendoregon.gov](mailto:lfaha@bendoregon.gov) or (541) 317-3025; Relay Users Dial 7-1-1. Providing, at least, 3 days' notice prior to the event will help ensure availability.

## **City of Bend Utility Public Advisory Group – Background Information for April 5, 2023 Meeting**

**Below is a brief summary of past work on stormwater program issues, especially the “drainage and density” topic. Also included are some definitions and photos to provide background for our next UPAG meeting.**

### **Previous Stormwater PAG Discussions on Stormwater Drainage & Density**

In 2017 the City of Bend Stormwater Public Advisory Group began to focus discussion on stormwater and Bend’s increase in size and density. The Stormwater PAG input was designed to inform direction and development of updates to the Stormwater Master Plan and development standards/codes.

Between 2017 and 2018 the Stormwater PAG helped develop the following:

- Strengths-Weaknesses-Opportunities-Threats/Constraints (SWOT) analysis and comparison table for on-lot, neighborhood/streetside, & regional scale stormwater management scenarios
- Identification of study needs and recommendations on specific topics

### **2018-2022 Drainage and Density Progress**

- A few developments were approved with mixed stormwater drainage (private drainage conveyed through ROW to regional facilities)
- 2020 Infiltration Study to inform appropriate facilities and the Stormwater Master Plan
- LID Site Planning Preparation- initial reviews of other jurisdictions’ design manuals
- Pervious Pavement- initial research and review of design guidelines
- Gap analysis- compared new DEQ permit requirements for development vs. existing City requirements

### **Current Regulatory Definitions**

Green Infrastructure (GI): is a specific type of stormwater control using vegetation, soils, and natural processes to manage stormwater. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems designed to mimic nature by reducing and/or storing stormwater through infiltration, evaporation, and transpiration. At the site level, such measures may include the use of plant or soil systems, permeable pavement or other pervious surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters. At the scale of city or county, green infrastructure refers to the patchwork of natural areas that provides flood protection and natural processes that remove pollutants from stormwater.

Low Impact Development (LID): is a stormwater management approach that seeks to mitigate the impacts of increased runoff and stormwater pollution using a set of planning, design and construction approaches and stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater, and can occur at a wide range of landscape scales (i.e., regional, community and site). Low impact development is a comprehensive land planning and engineering design approach to stormwater management with a goal of mimicking the pre-development hydrologic regime of urban and developing watersheds.

Impervious Surface: is any surface resulting from development activities that prevents the infiltration of water. Common impervious surfaces include: building roofs; traditional concrete or asphalt paving on walkways, driveways, parking lots, gravel lots and roads; and heavily-compacted earthen materials.



*Have you run in to any challenges or barriers in implementing LID or Green Infrastructure in development?*



*Townhomes on Reed Market Rd, Bend*



*Townhomes on Empire Blvd, Bend*



*12th Ave green street- Portland*



*Walkway swale along riverside homes, Bend*



*Bend Park and Recreation District green roof, Bend*



### DRAINAGE TO UNDERGROUND DRINKING WATER PROTECTION AREAS

#### Small Infill Lot

- Onsite & Streetside Controls

#### New Developments or Large Redevelopments

- Combination: Onsite, Streetside, and Regional
- Onsite and Regional

### GEOLOGIC CHALLENGES

#### Small Infill Lot

- Combination: Onsite, Streetside, and Regional

#### New Developments or Large Redevelopments

- Combination: Onsite, Streetside, and Regional
- Onsite and Regional

### DENSITY OPPORTUNITY AREAS

#### Small Infill Lot

- Onsite
- Regional
- Combination: Onsite, Streetside, and Regional

#### New Developments or Large Redevelopments

- Regional
- Combination: Onsite, Streetside, and Regional

### DRAINAGE TO THE RIVER

#### Small Infill Lot

- Onsite & Streetside Controls
- Onsite

#### New Developments or Large Redevelopments

- Combination: Onsite, Streetside, and Regional
- Onsite and Regional

### LESS SENSITIVE DRAINAGE AREAS

#### Small Infill Lot

- Onsite

#### New Developments or Large Redevelopments

- Onsite
- Combination: Onsite, Streetside, and Regional



## Stormwater Public Advisory Group Recommendations - Fall 2018

The City of Bend Stormwater Public Advisory Group has been focused over the last 18 months on how best to handle stormwater with increasing density as needed to meet State land use goals related to UGB expansion, and as the City becomes more urbanized. The following represent the results of prioritization exercises in a perfect world without additional complications, regulatory requirements, competing needs, etc. To that end, the PAG recognizes the need for and highly prioritizes flexibility especially for last lot small infill projects.



## Glossary of Terms -

**ONSITE CONTROLS** seek to increase permeability, reduce impervious surface area and directly connected impervious areas to increase retention and detention through such practices as (a) reduced building and (b) parking footprints, (c) rain gardens, (d) disconnected downspouts, (e) permeable pavement or decks/benches, (f) green roofs, (g) cisterns, (h) underground injection controls.



**NEIGHBORHOOD STREETSIDE CONTROLS** are controls in the public right of way or private streetside designed either to retain or detain stormwater to reduce the amount or rate of runoff.

These may include (a) green streets bioinfiltration, planter boxes, (b) filter strips, or underground injection controls.



**REGIONAL (SUBDIVISION) CONTROLS** are designed to take, detain/retain the stormwater from multiple lots through a retention or detention basin or swale.



### Accommodation Information for People with Disabilities

To obtain this information in an alternate format such as Braille, large print, electronic formats, etc. please contact Utility Department at: (541) 317-3000 ext. 2, utilities@bendoregon.gov, Relay Users Dial 7-1-1.



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# **Utilities Public Advisory Group**

## **Stormwater Topic Slides**

April 5, 2023 • 11 am–12:30 pm • Zoom Meeting

Lori Faha, P.E., Environmental Resources Manager  
Dan Denning, Water Conservation Program Manager  
Elisabeth O'Keefe, Stormwater Program Manager  
Aubrie Koenig, Facilitator



# Prior Work Will Inform Stormwater Updates

## Past Work:

- The previous Bend Stormwater PAG discussed in detail the complexity of “drainage and density” issues in 2017-2022 (*per emailed attachment*)
- Technical work needs were identified and some progress made by the City on research, compiling gaps/needs for standards updates

## Next Steps:

- Program/standards/codes updates to ensure permit compliance, and reporting steps and timing to DEQ in updated iSWMP
- Create reasonable and sustainable methods for accommodating drainage and density that:
  - Continues to prioritize onsite stormwater management
  - Provides simple tools and pathways for small and infill projects



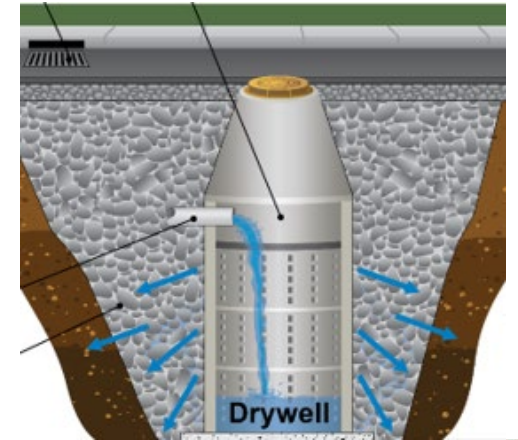


# Stormwater terms

Green infrastructure

Low impact development

Pervious and impervious





# Green Infrastructure

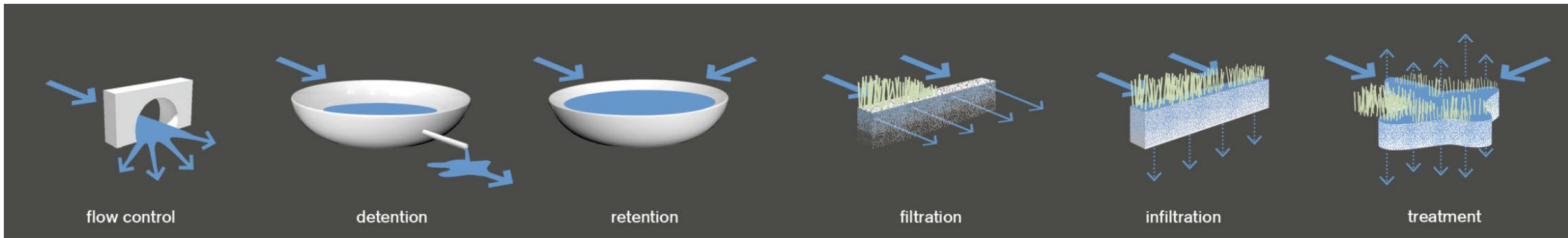


- *a specific type of stormwater control using vegetation, soils, and natural processes to manage stormwater*
  - *mimics nature by reducing and/or storing stormwater through infiltration, evaporation, and transpiration*
  - *provides flood protection and natural processes that remove pollutants from stormwater*
- \*a drywell could also be considered part of a green infrastructure toolkit



# Low Impact Development

- *a comprehensive land planning and engineering design approach to stormwater management with a goal of mimicking the pre-development hydrologic regime of urban and developing watersheds*
- *promotes the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater*



slow —————→ spread —————→

**flow control:** The regulation of stormwater runoff flow rates.

**detention:** The temporary storage of stormwater runoff in underground vaults, ponds, or depressed areas to allow for metered discharge that reduce peak flow rates.

**retention:** The storage of stormwater runoff on site to allow for sedimentation of suspended solids.

**filtration:** The sequestration of sediment from stormwater runoff through a porous media such as sand, a fibrous root system, or a man-made filter.

**infiltration:** The vertical movement of stormwater runoff through soil, recharging groundwater.

**treatment:** Processes that utilize phytoremediation or bacterial colonies to metabolize contaminants in stormwater runoff.

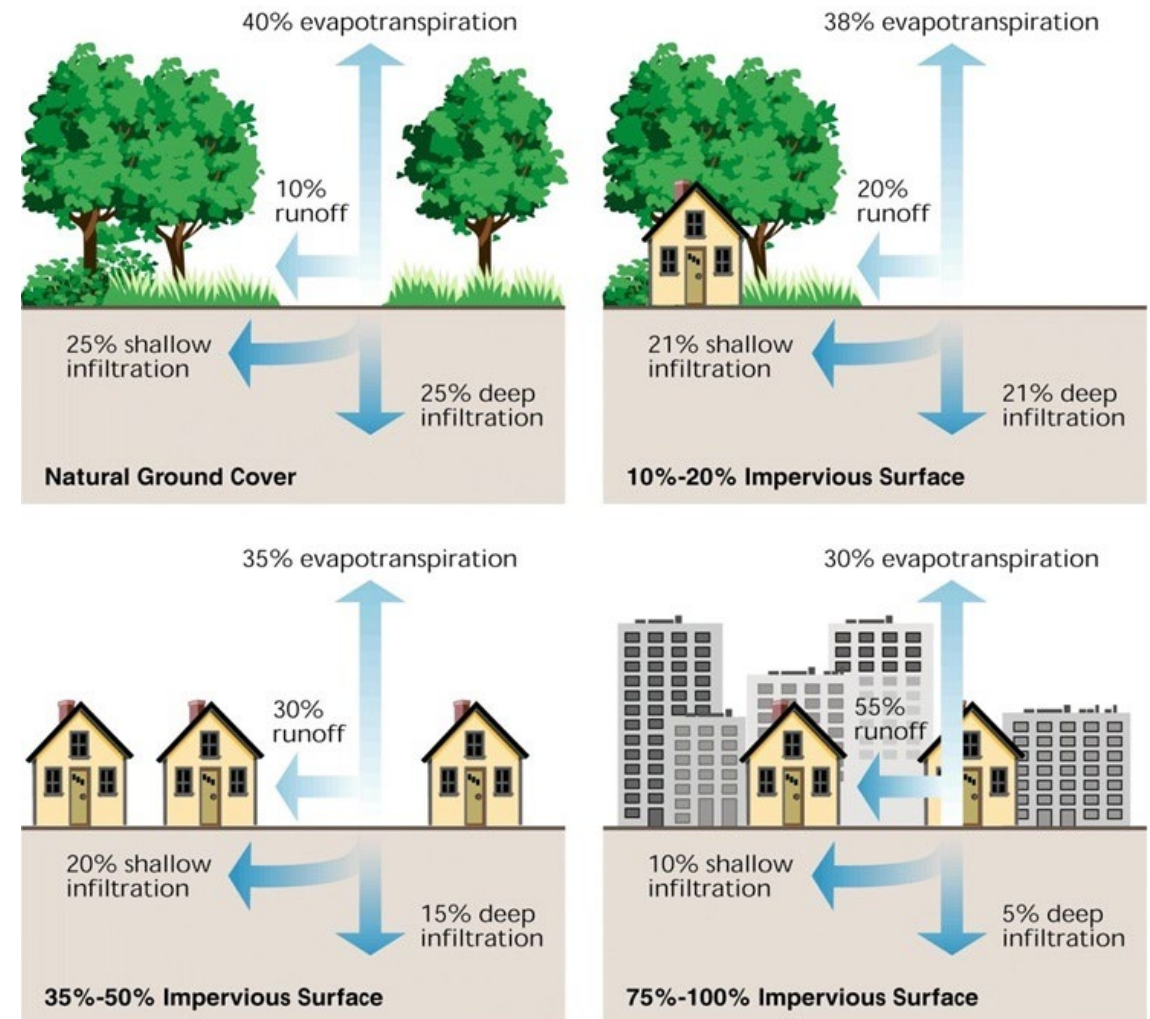


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# Pervious vs Impervious

- **Impervious surface** is any surface resulting from development activities that **prevents the infiltration of water**.
- Common impervious surfaces include: building roofs; traditional concrete or asphalt paving on walkways, driveways, parking lots, gravel lots and roads; and heavily-compacted earthen materials.



*Stream Corridor Restoration: Principles, Processes and Practices (FISRWG 1998)*



# Stormwater and development

## Current Typical Requirements

Development must retain all stormwater onsite

Street/ROW systems are designed to handle ROW runoff plus the front 20' of adjacent lots

UIC's (drywells with pretreatment from sedimentation manholes) typical in most ROW areas and many private sites

SF lots typically just use surface retention in the landscape

A few master planned developments send some "private" runoff into private or public ROW systems

## Upcoming Changes/Needs



Apply standards to smaller sites (5000 sf impervious area threshold, no exemptions)

Increased density, less available pervious areas ("drainage and density")

Apply standards to re-development (replacement of existing impervious)

Create hierarchy for standards – first manage onsite, then if needed have options for offsite stormwater management

Consider impacts of more frequent, short duration, high intensity storms



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# Approaches to drainage and density

## A potential stormwater hierarchy:

1. All onsite disposal
2. 25-yr storm onsite, 100-year overflow to ROW
3. Partial onsite (WQ storm?), remainder to “subdivision level” facility
4. All stormwater managed at “subdivision level”
5. Partial (or none) onsite, remainder to ROW or public regional facility



Townhomes- Empire Blvd



Townhomes- Reed Market

*When to allow  
moving down  
the hierarchy?*



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# Should we add a Simplified Approach?

## Simplified approach

Streamlined checklist approach,  
simplified submittal form

For small sites, e.g. 1-4 lots  
SF/Duplex, small commercial

Only onsite surface disposal of  
stormwater

Short list of measures, EZ math to  
figure how many, how big

Short form, no drainage report

- How do we confirm construction?
- Should we assume these will fully function or design extra capacity in ROW?

## Design approach

General guidelines & minimum  
standards provided

For larger projects, similar to  
current COSM standards

Includes any site with drywells

Engineering geotech & drainage reports  
and engr plans required, landscape plan  
if needed, Engr sign-off upon completion

Maintenance agreement required,  
attached to deed

Should we consider a Simplified Approach for smaller sites with onsite WQ storm mgmt. and offsite discharge of remainder to approved facilities?





# Stormwater maintenance responsibilities



## Current Pathways

- Property owner manages onsite
- Public ROW managed separately
- Some master plan developments: private & public conveyance in ROW, but managed onsite.
  - Ex: Luderman Crossing Development

## Upcoming Changes/Needs

- Public/private regional facilities?
- Planning & standards for redevelopment areas such as City Core Area
- Determine who manages co-mingled storm facilities
  - If we publicly maintain – how to fund
  - Can we depend on HOA's and others to maintain long term?





# Luderman Crossing Development

Developer gave up two lots for regional drainage facilities.

- Reduced the number of drywells by half, installing private collection systems for roof runoff.
- Subdivision is designed to keep the 100-year storm event onsite.
- HOA maintains





# UPAG focus questions



- Are you aware of challenges or barriers in implementing LID or Green Infrastructure in development?
- Under what scenarios should offsite drainage be an option for development projects?
- What factors should be considered when determining ongoing maintenance responsibility for structural stormwater facilities (private, commercial, & comingled)?
- What areas of training are lacking for permitting, design and/or maintenance of stormwater measures?

