

# Green Infrastructure Considerations in Site Analysis, Site Design and Selection of Stormwater Control Measures

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# POSITIVE IMPACTS OF STORM WATER



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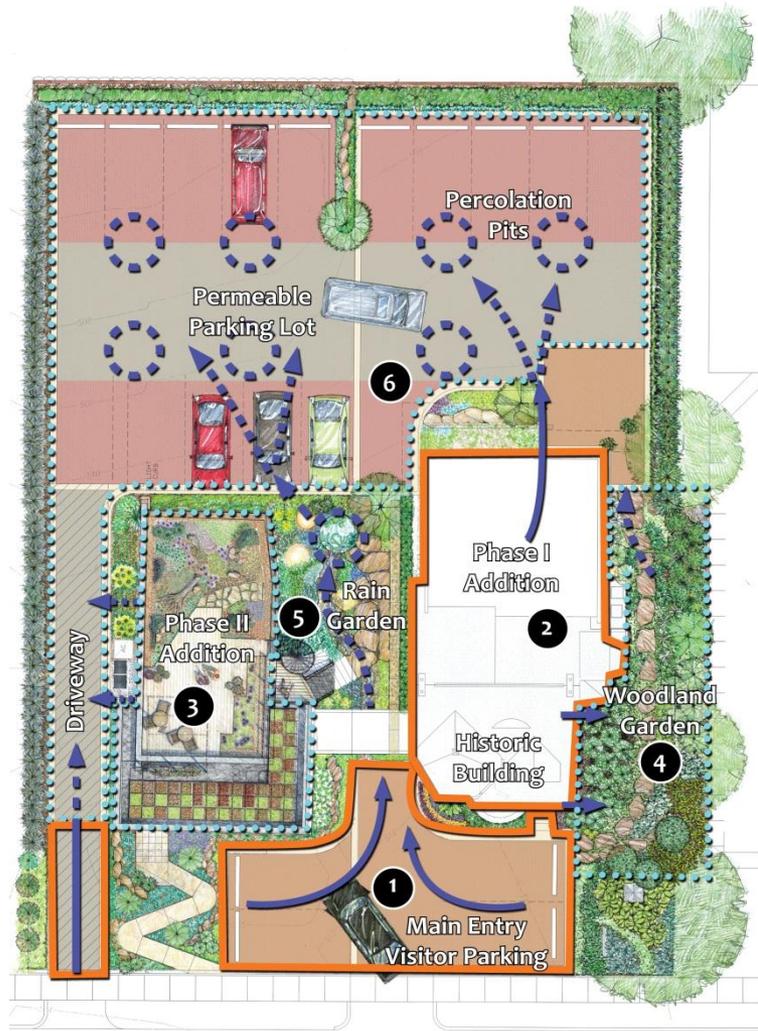
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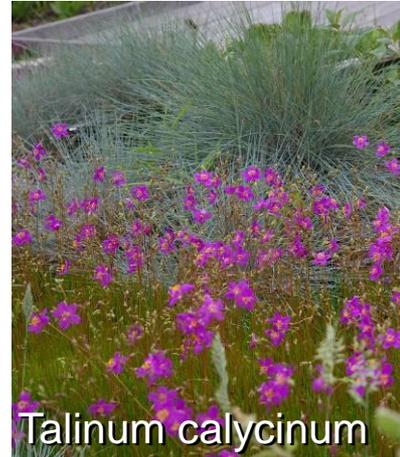
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SUSTAINABLE **SITES** INITIATIVE™



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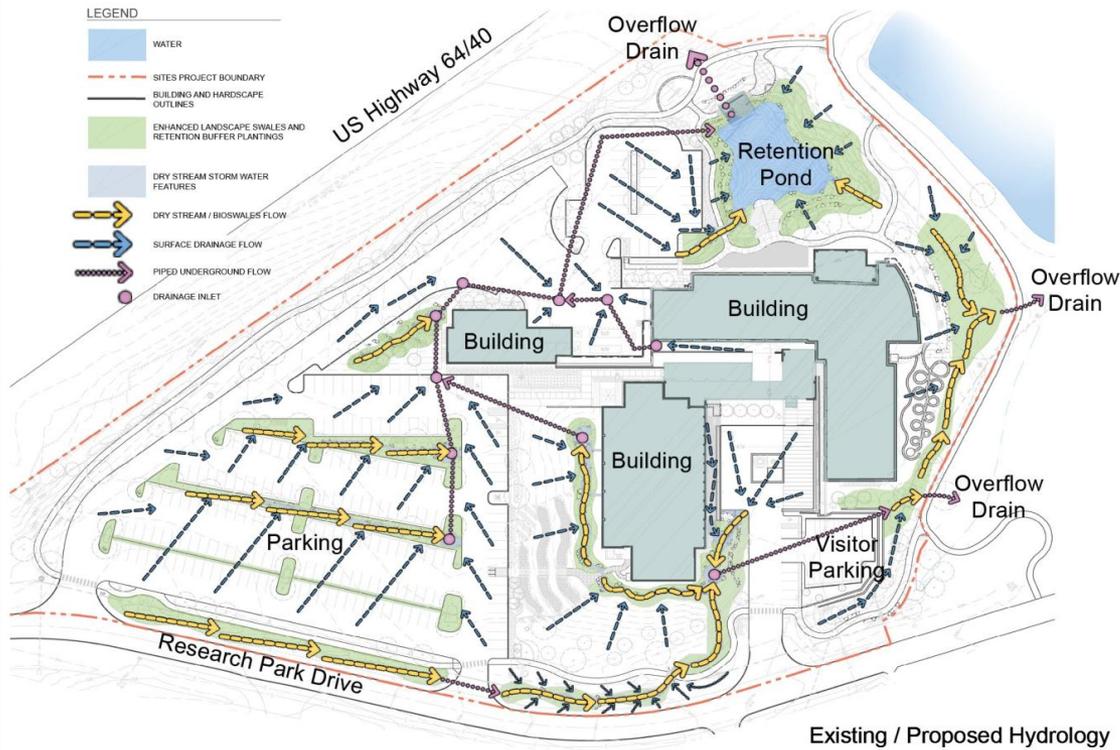
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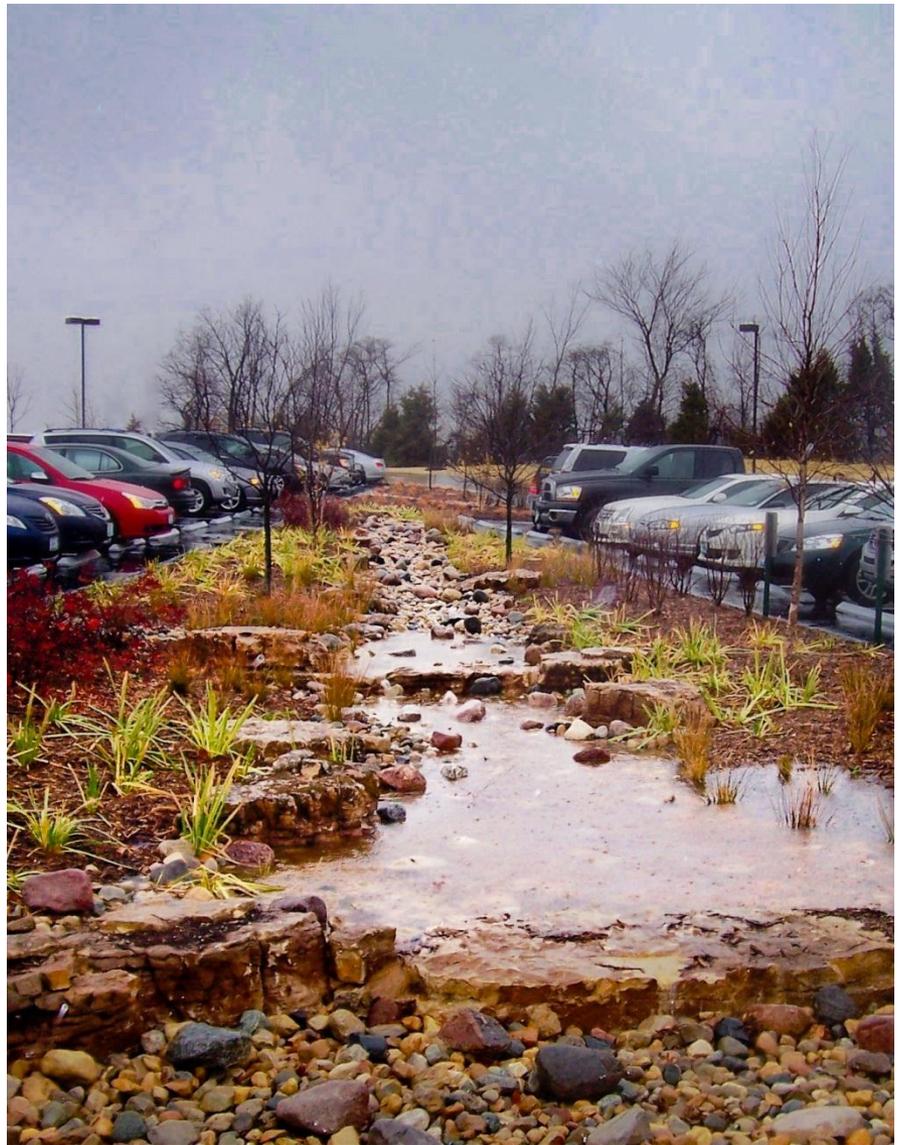
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# MSD Regulations

- Water treatment
  - TSS, metals, nutrients
- Volume Reduction
  - Hydrology of smaller storms
- Channel Protection
  - Extended detention of 1-yr storm
- Flood Protection
  - Peak flow detention (2 & 100-yr storms)



# Early Planning is Critical

- Site Design Guide
  - ID existing natural resources
  - Develop a concept development plan
  - Coordinate construction & post-construction BMPs
- Greenspace: it's important to site design
- Lessons:
  - Have a water quality plan with the land disturbance plan
  - Integrating greenspace and impervious area saves dollars & headaches



# Chapter 2 – MO Guide

## References

- Existing Natural Resource Considerations
- Site Development Goals, Questions and Methods
- Plan Review Checklist



# MSD BMP Toolkit

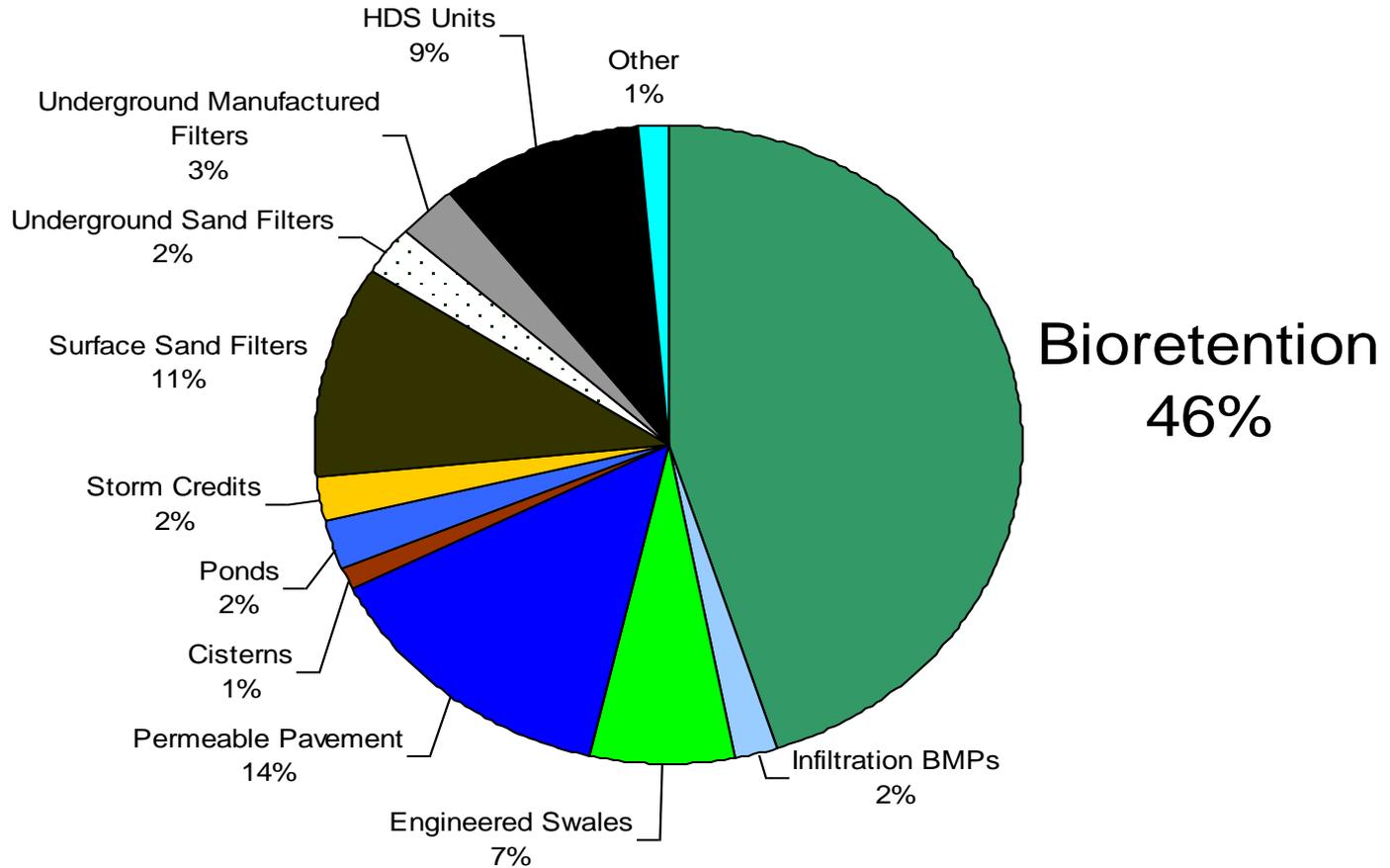
[www.stlmsd.com](http://www.stlmsd.com)

BMP Technology	Performance/Function			
	Volume Reduction	Water Quality Treatment	Channel Protection Storage	Peak Flood Detention Storage
Bioretention	Yes	Yes	Yes	Yes
Porous Pavement	Yes	Yes	Yes	Qp <sub>v</sub> Reduction Only*
Rainwater Harvesting	Yes	WQ <sub>v</sub> Reduction Only	CP <sub>v</sub> Reduction Only*	Qp <sub>v</sub> Reduction Only*
Green Roof	Yes	WQ <sub>v</sub> Reduction Only	CP <sub>v</sub> Reduction Only*	Qp <sub>v</sub> Reduction Only*
Sheet Flow to Buffer (Credit)	Yes	Yes	CP <sub>v</sub> Reduction Only*	Qp <sub>v</sub> Reduction Only*
Sand/Perlite Filters	No	Yes	No	No
Stormwater Ponds and Wetlands	No	Yes	Yes	Yes
Proprietary BMPs	No	Technology Dependent	Technology Dependent	Technology Dependent
Open Channel Use (Credit)	No	Yes	No	No
Dry Detention Basin	No	No	Yes	Yes



# BMP SELECTION

Post-Construction BMPs Built, Permitted for Construction,  
or Under Review as of 2/3/2012  
1583 Total BMPs



# Rain Gardens & Bioretention

- MSD Toolkit References (BMP)
  - Bioretention
- GI Guide References (SCM)
  - Bioretention
  - Rain gardens
  - Tree box and tree vault
  - Bioswales





# Bioretention



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# Bioretention



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# Rain Garden



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# Bioswales



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# Permeable Pavement

- MSD Toolkit References
  - Porous Pavement
    - Porous Asphalt
    - Permeable Concrete
    - Permeable Interlocking Concrete Pavers
- GI Guide References
  - Pervious Pavements



# Porous Asphalt



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# Permeable Concrete



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# PICP



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# Rainwater Harvesting

- MSD Toolkit References
  - Rainwater Harvesting
- GI Guide References
  - Rain Barrels
  - Cisterns



# Rainwater Harvesting

- Cisterns
  - SCM →



- Rain Barrels
  - Public Outreach →



# Green Roofs



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# Wetlands and Wet Ponds

Pre-Stormwater Quality  
“Retention” Pond



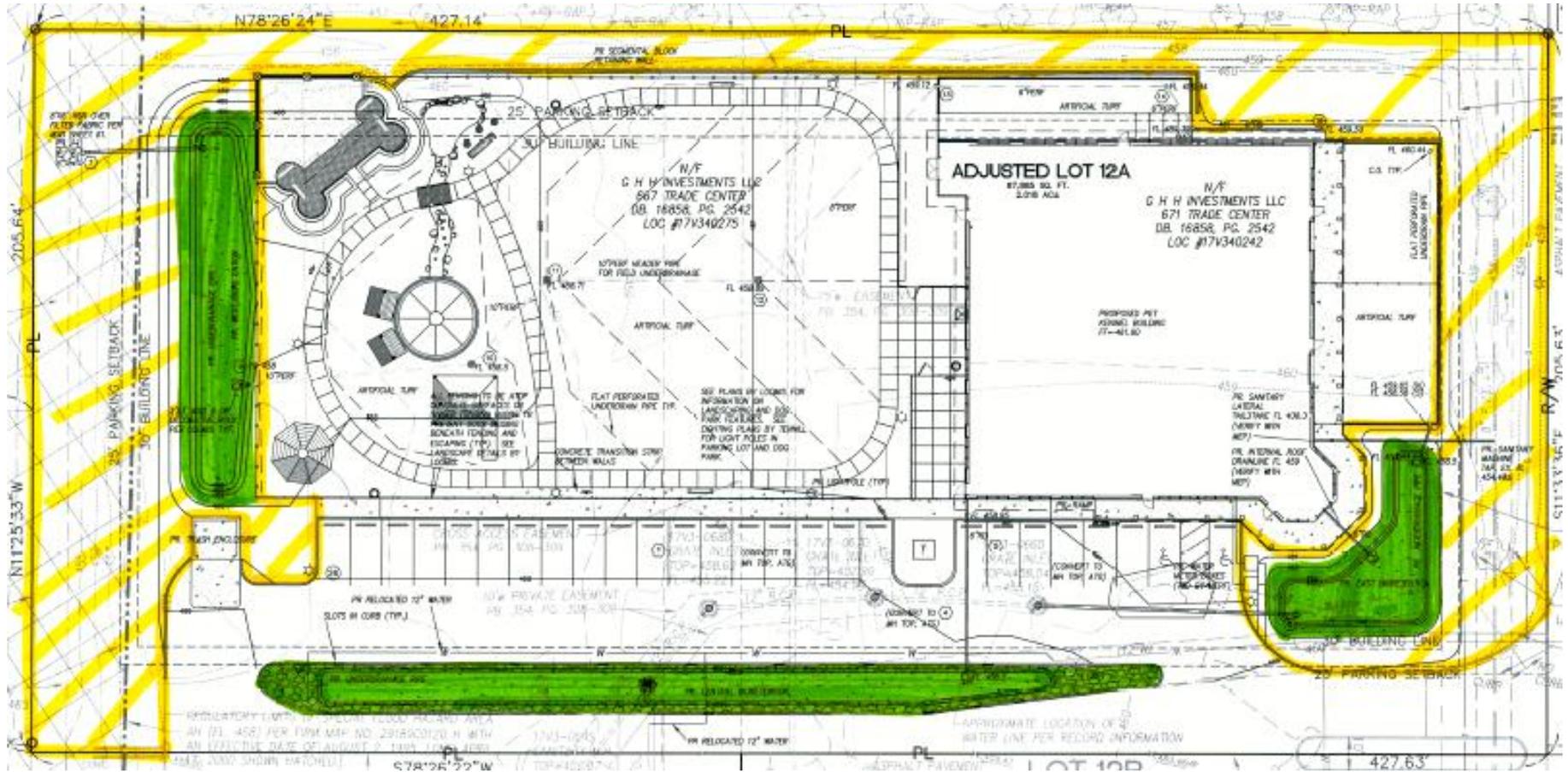
Stormwater Quality  
Wet Pond



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# Integrated Green Infrastructure

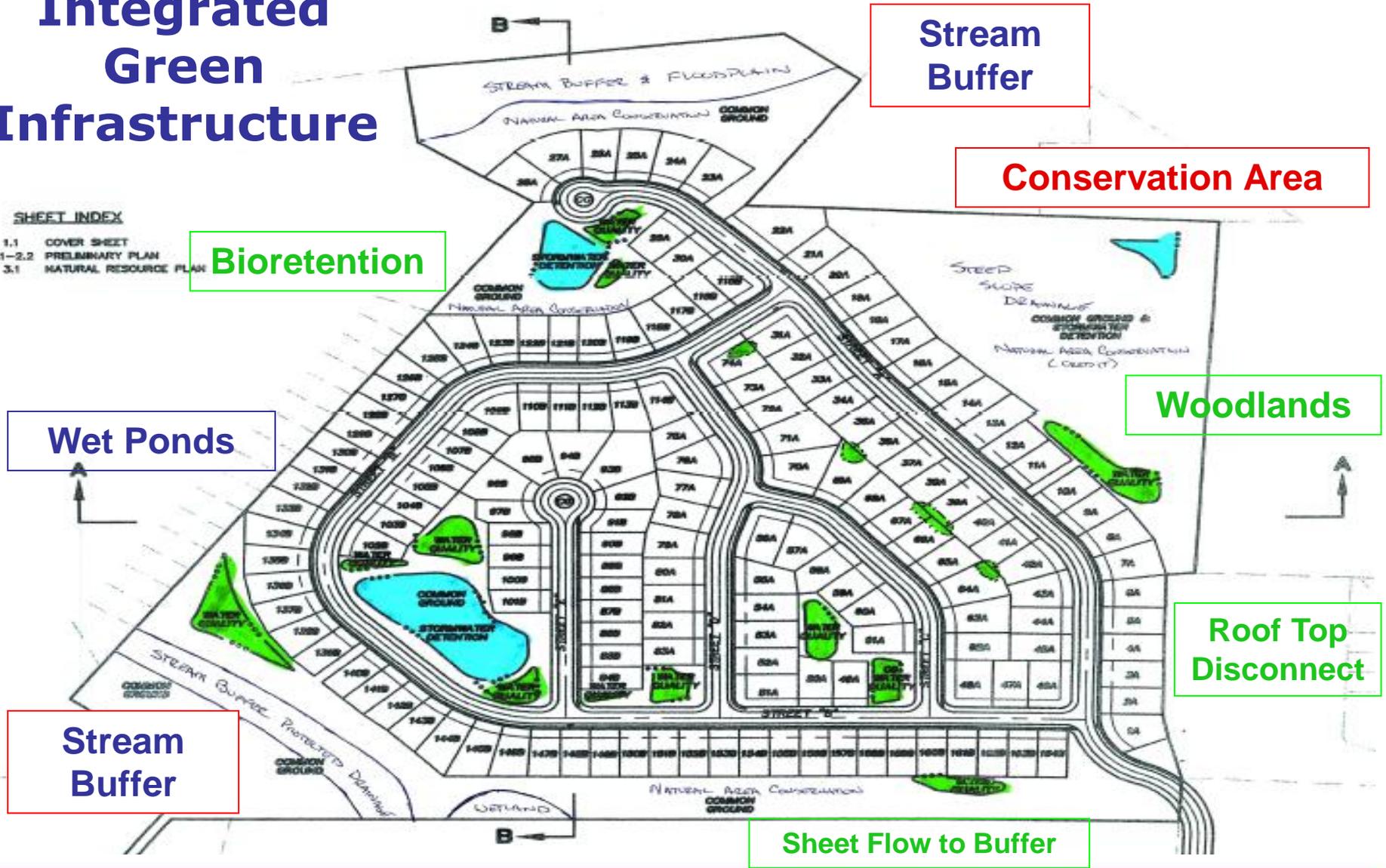


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# Integrated Green Infrastructure

**SHEET INDEX**  
 1.1 COVER SHEET  
 2.1-2.2 PRELIMINARY PLAN  
 3.1 NATURAL RESOURCE PLAN



**QUALITY SERVICE ALWAYS**

# Benefit of Green Infrastructure

- Use planning strategies to identify, protect, and enjoy natural resources
- Use multiple stormwater control practices within the watershed, to better mimic natural runoff conditions
- Wetlands and ponds at the lower end of the watershed provide channel protection, flood detention, **and recreation!**

