

# Upper Trinity River Basin Coordinating Committee (UTRB-CC) Meeting

Tuesday, April 7, 2026

Joy Douglas, E&D Planner

# Welcome and Introductions

- The meeting agenda, presentation, and handouts are located: [NCTCOG - Upper Trinity River Basin Coordinating Committee](#)

# Meeting Attendance

Click the link below or scan the QR code to record your attendance:

<https://forms.cloud.microsoft/r/TaxfHWpCGr>

Upper Trinity River Basin  
Coordinating Committee  
4/7/26 Meeting Attendance



# UTRB-CC Overview

# UTRB-CC Overview

- **Purpose:** gather stakeholders to share information, successes, challenges, and updates on projects that impact water quality and bacteria
- **Schedule:** meets twice a year, features a member or topic presentation and project update/roundtable session
- ***The UTRB-CC is supported by the NCTCOG TMDL Program***

# Project Updates

# Project Updates

- City of Arlington
- City of Dallas
- City of Fort Worth
- City of Grand Prairie
- City of Irving
- City of Plano
- North Texas Municipal Water District
- Tarrant Regional Water District
- Texas A&M AgriLife
- Trinity River Authority
- Upper Trinity Regional Water District
- Other Stakeholders

# NCTCOG TMDL Updates

- Annual TMDL Coordinating Committee Meeting: June 24, 2026 at 9:30 AM, NCTCOG Offices

# NCTCOG Updates

## Upcoming Meetings:

- Stormwater Public Education Task Force: April 8, 2026 at 10:00 AM, NCTCOG Offices
- Construction + Post-Construction Task Force: April 14, 2026 at 11:45 AM, NCTCOG Offices
- iSWM Implementation Subcommittee Meeting: April 14, 2026 at 1:30 PM, NCTCOG Offices
- Wastewater And Treatment Education Roundtable: April 16, 2026 at 10:00 AM, Chris W. Burkett Service Center
- Water Resources Council: April 22, 2026 at 10:30 AM, NCTCOG Offices
- Joint Pollution Prevention/Illicit Discharge Detection & Elimination Task Forces: June 3, 2026 at 10:00 AM, NCTCOG Offices



# STAKEHOLDER PROJECT UPDATE MEETINGS

**MONDAY, MAY 4**

Pecan Grove  
Convention Center

405 N Las Vegas Trail  
White Settlement, TX 76108

**TUESDAY, MAY 5**

Decatur Conference Center

2010 W. HWY US 380  
Decatur, TX 76234

**THURSDAY, MAY 7**

Denton County Southwest  
Courthouse

6200 Canyon Falls Drive  
Flower Mound, TX 76226

**TUESDAY, MAY 12**

Burleson City Hall

141 W. Renfro Street  
Burleson, TX 76028

**All meetings from 10 a.m. – 12 p.m.**

For more information: [www.nctcog.org/tsi](http://www.nctcog.org/tsi)

# Upcoming Events

- [2026 South Central Climate Resilience Forum](#), San Antonio, TX
- [Texas Water Conference 2026](#), San Antonio, TX
- [Texas Freshwater Mussel and Inland Fish Workshop](#), San Marcos, TX
- [TCEQ Trade Fair](#), Austin, TX
- [NCTCOG Annual Public Works Roundup](#), Hurst, TX
- [APWA Public Works Expo](#), Houston, TX

# Roundtable

# Programmatic Inquiries

- Interest in a cooperative purchase of Texas Stream Team testing kits?
- Interest in regional Texas Stream Team training?



# Special Presentation:

Bardia Heidari, Ph.D., P.E.  
Research Scientist, Texas Water Resources Institute  
(TWRI)  
Texas A&M AgriLife Research

# VILLAGE CREEK-LAKE ARLINGTON WATERSHED BIORETENTION CELLS- COMMUNITY ENGAGEMENT OPPORTUNITY

Apr 7<sup>th</sup> 2026

Bardia Heidari, PhD, PE, Texas A&M AgriLife  
[b.heidariharatmeh@ag.tamu.edu](mailto:b.heidariharatmeh@ag.tamu.edu)

Fouad Jaber, Ph.D., P.E., Texas A&M AgriLife  
[fouad.jaber@ag.tamu.edu](mailto:fouad.jaber@ag.tamu.edu)



Funding for the Arlington Project is provided by the United States Environmental Protection Agency under assistance agreement 582-24-50224 to Texas Commission on Environmental Quality.



# AGENDA

1

Background on watershed management

2

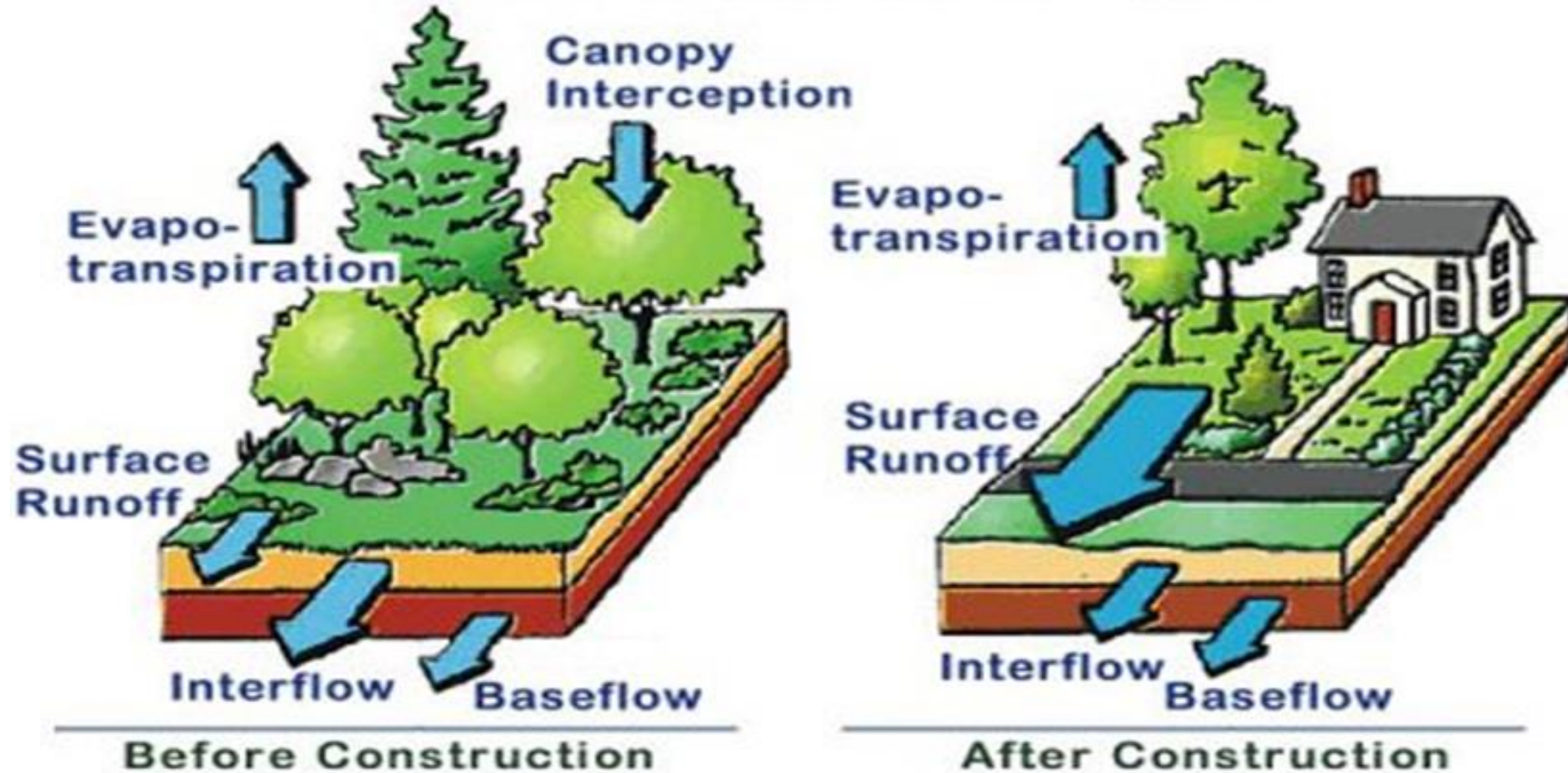
Project information

3

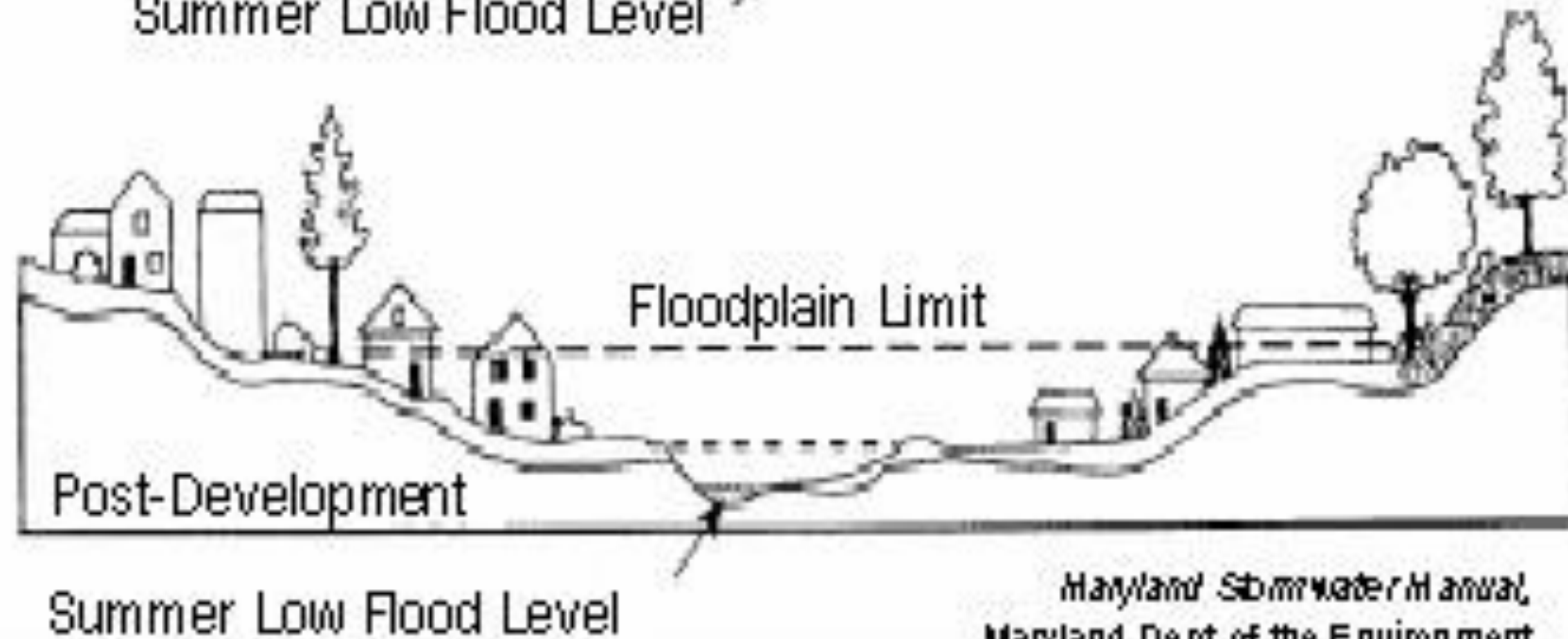
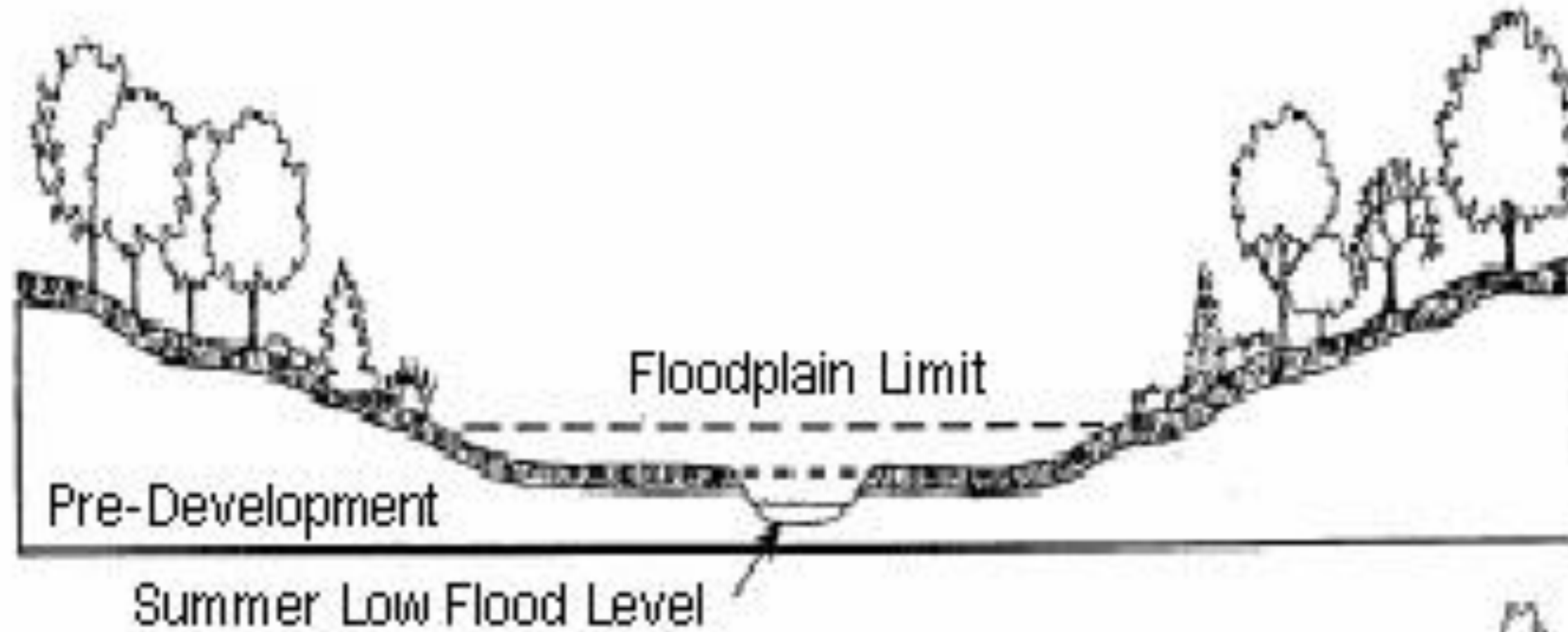
Rain garden information, design, and tour

# URBAN VS NATURAL HYDROLOGY

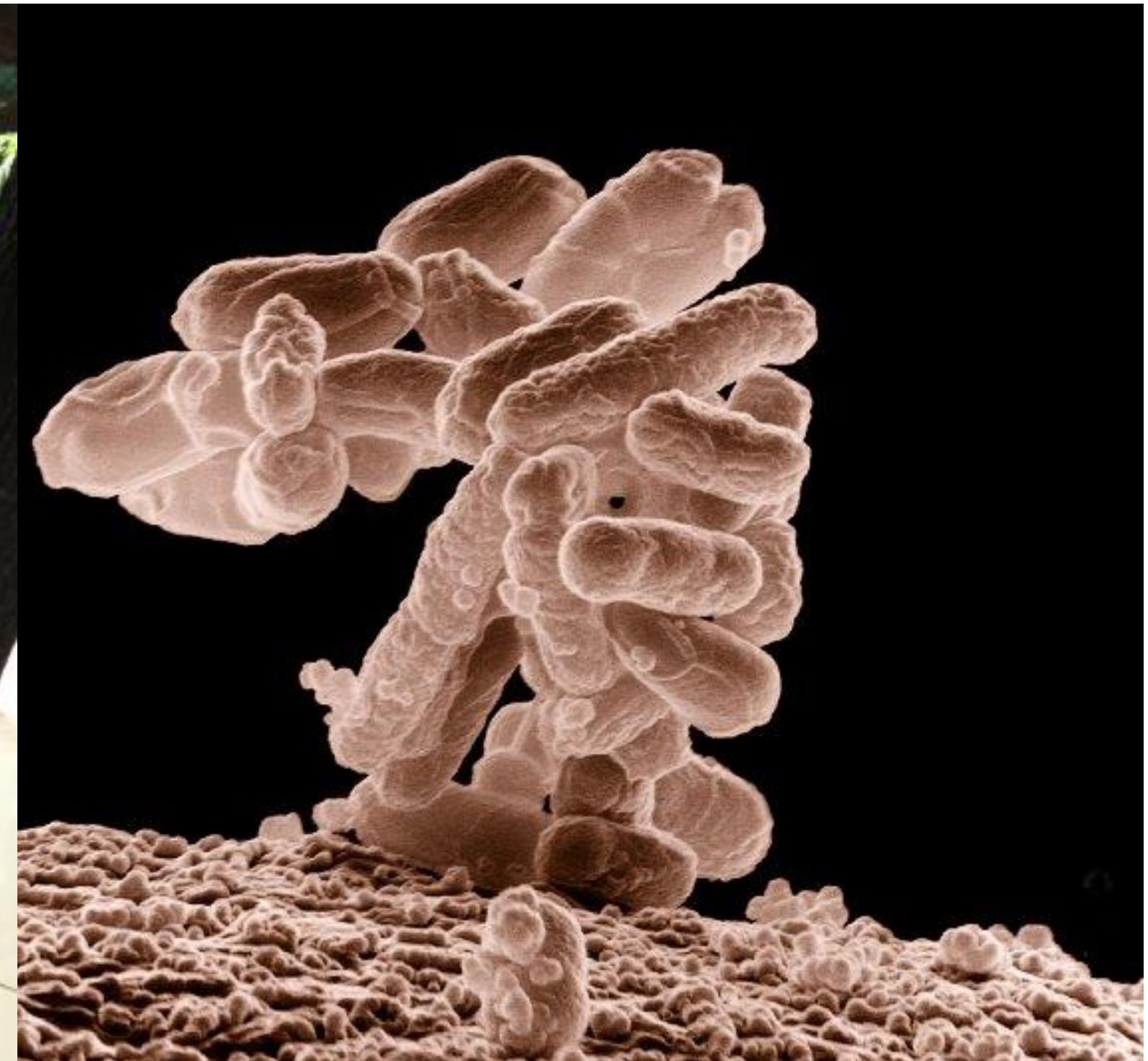
## Local Hydrologic Cycle



# WHY IS STORMWATER A CONCERN?



# WHY IS STORMWATER A CONCERN?



# BACTERIA IMPAIRMENT *E. COLI*

- Impacted by urbanization
- Pets as one of main sources
- **Impacts:**
  - Listed as impaired waters
  - Spread of disease among both humans and animals
  - Closing recreational waters
  - Cost of treating drinking water
  - Habitat degradation
  - Decline in abundance and biodiversity



# BLUE-GREEN INFRASTRUCTURE/ NATURE-BASED SOLUTIONS

- Rain garden-bioretenention areas
- Porous pavements
- Bioswales
- Rainwater harvesting



Background on Watershed Management



# RAIN GARDEN-BIORETENTION AREAS

## Rain gardens:

mulched vegetated depression designed to capture and infiltrate a portion of surface stormwater runoff



## Bioretention cells:

a sophisticated rain garden, usually involving the removal of native soil that is replaced with a high infiltration engineered soil mix. Bioretention areas often include a perforated pipe midway through the total depth

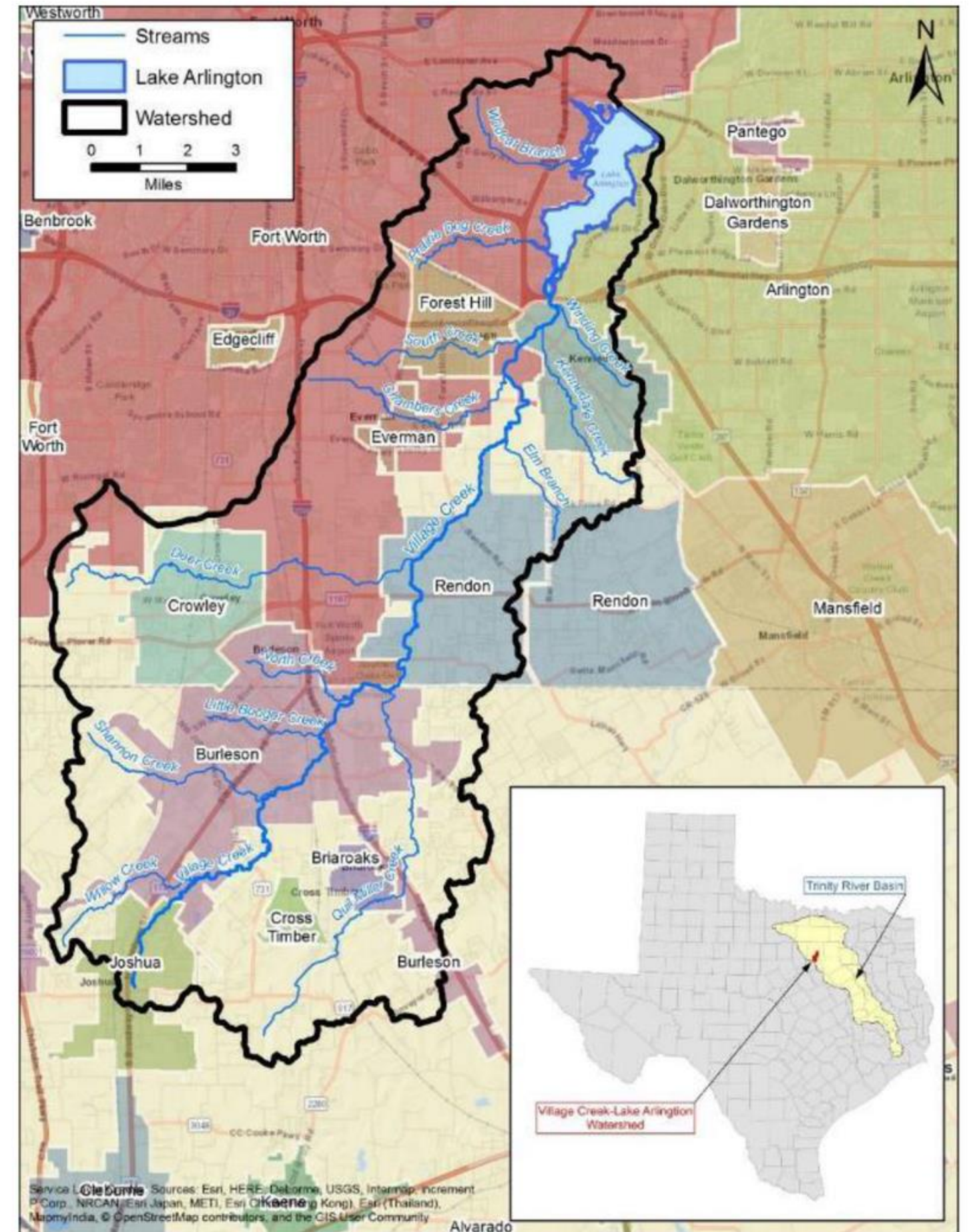


# RAIN GARDEN BENEFITS

- Reduce the volume and speed of water flowing into storm drains, streams, and rivers → prevent flooding, erosion, and damage to natural waterways
- filters contaminants such as phosphorus, sediments, fertilizers, and other chemicals → improves water quality and the health of local ecosystems
- Support biodiversity by providing habitat for a variety of wildlife, including pollinators such as bees and butterflies
- climate resilience moderate temperature extremes in urban environments, reducing the urban heat island effect, and increasing soil moisture retention
- Aesthetic and social benefits

# VILLAGE CREEK - LAKE ARLINGTON WATERSHED

- Lake Arlington is primarily fed by Village Creek
- Services drinking water to the city of Arlington and much of the eastern portion of Tarrant County
  - ~ 400,000 residents as of 2016
- Recreational use for boating and fishing

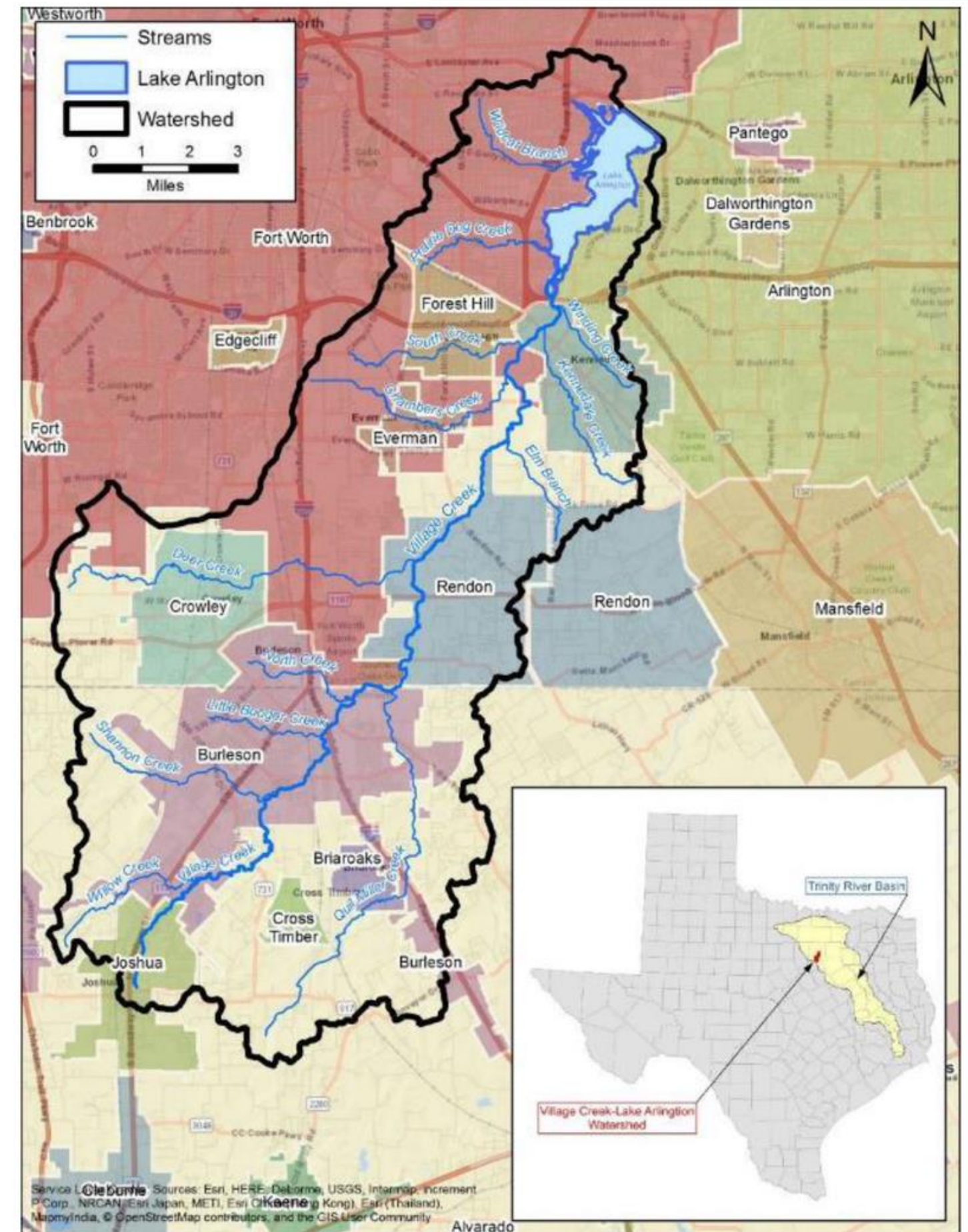


Basemap: ESRI World Streetmap; Stream data source: National Hydrography Dataset (NHD).

Location of Village Creek-Lake Arlington Watershed.

# VILLAGE CREEK - LAKE ARLINGTON (VCLA) WATER QUALITY ISSUES

- Village Creek first listed with bacteria (*E. coli*) impairment in 2010
- Lake Arlington concerning levels of Chlorophyll-a starting in 2006 and levels of nitrate in 2012
- Development of watershed protection plan (WPP) for the area, accepted by EPA in 2019
  - Best management practices (BMPs)
    - Up to 4 Bioswales/rain gardens (\$50,000 budget)



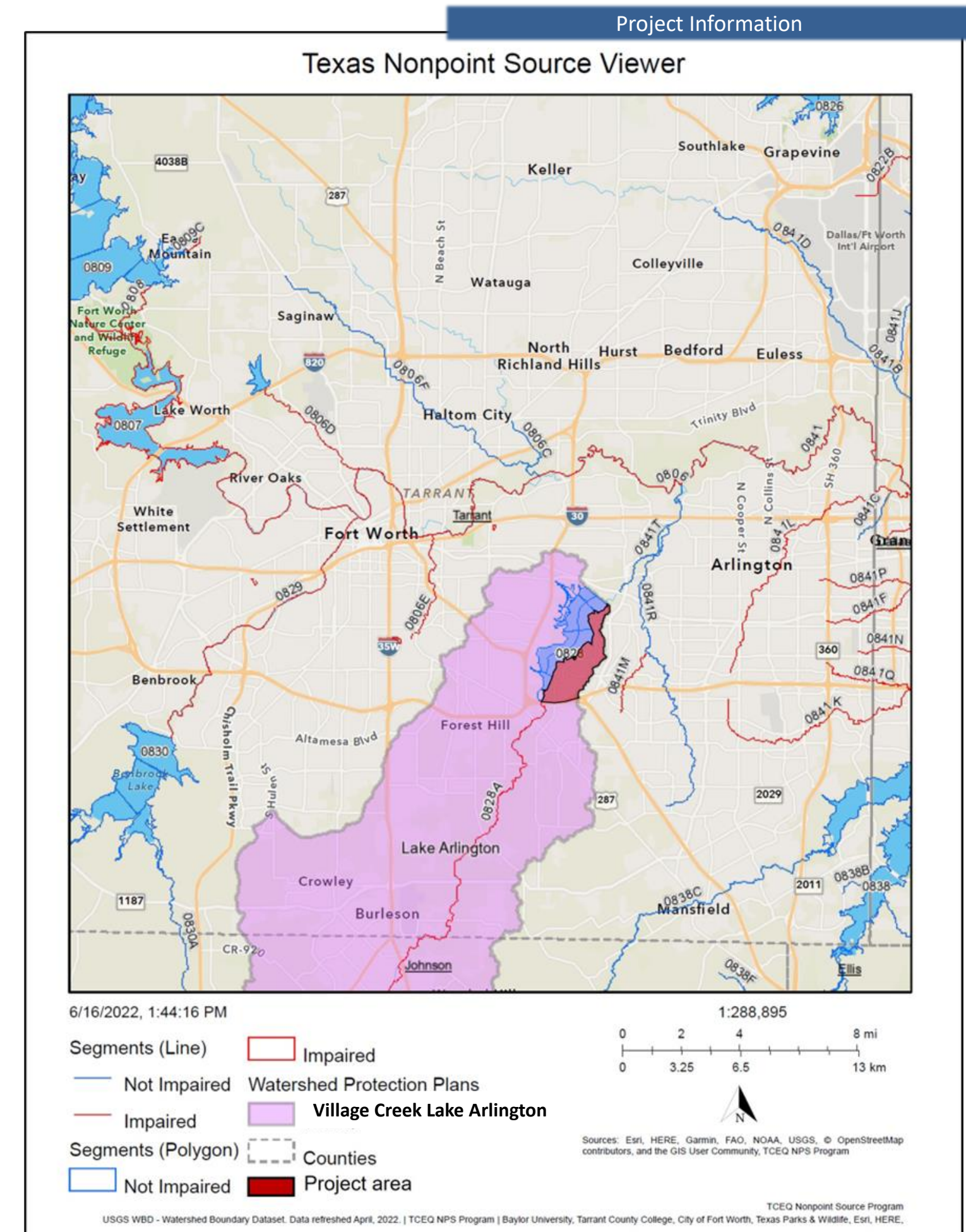
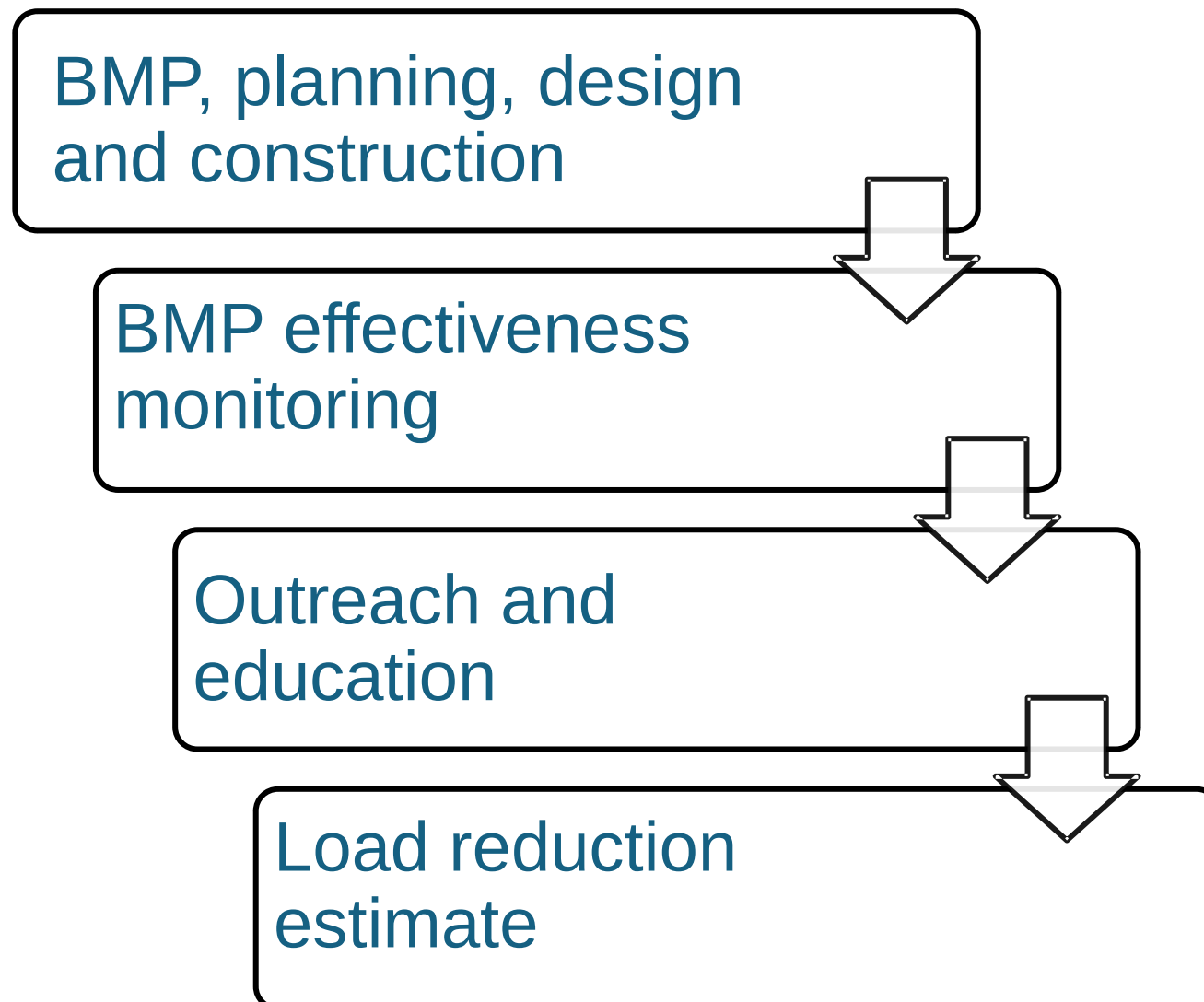
Basemap: ESRI World Streetmap; Stream data source: National Hydrography Dataset (NHD).

Location of Village Creek-Lake Arlington Watershed.

# BGI IMPLEMENTATION FOR VCLA

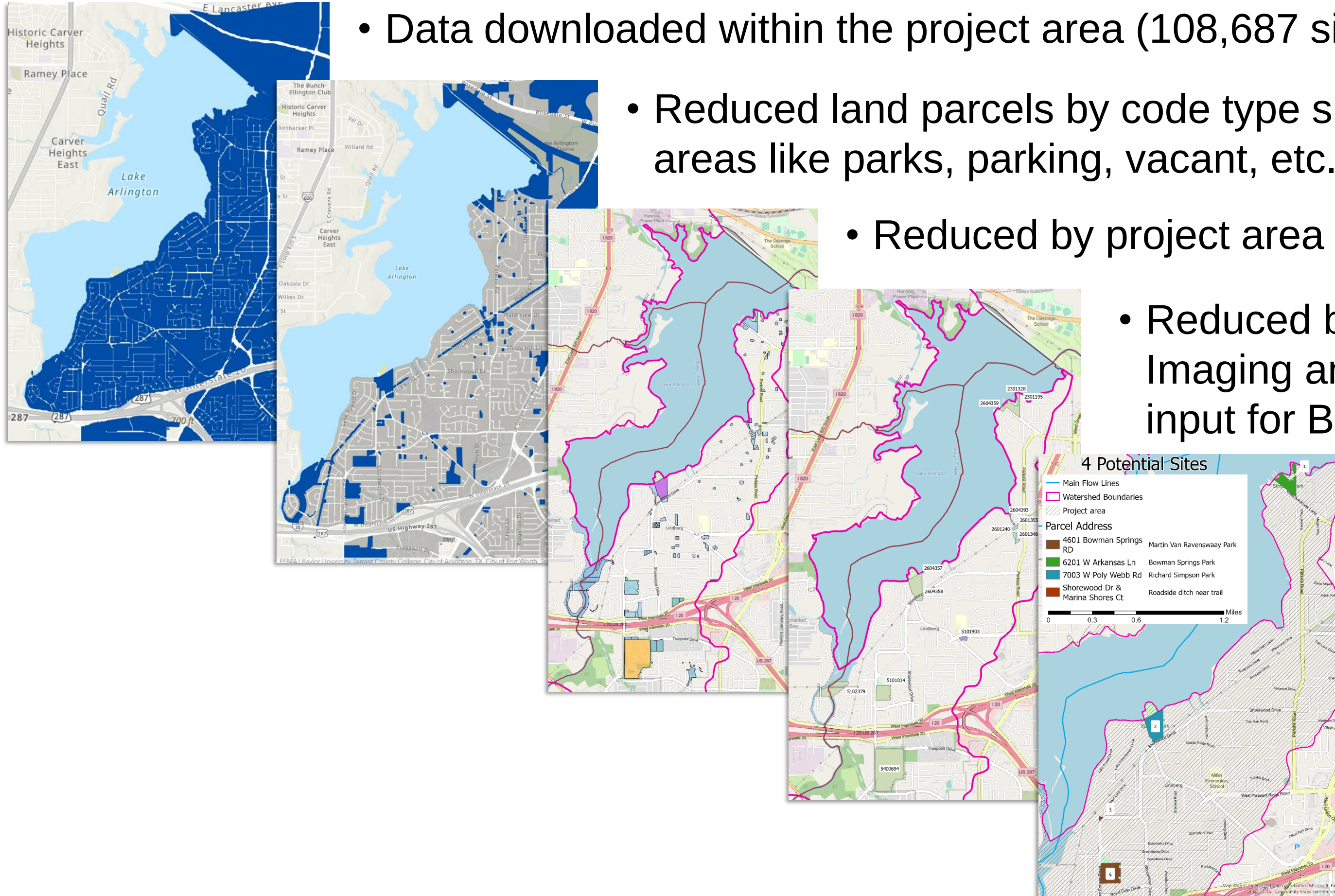
## Motivation & Objectives:

- *E. coli* loading in Lake Arlington
- The project implements the WPP by installing the select best management practices (BMPs) specifically BGI.



# DATA ACQUISITION

- Data downloaded within the project area (108,687 sites)
- Reduced land parcels by code type suitable to WPP identified areas like parks, parking, vacant, etc. (4,014 sites)
- Reduced by project area and size (134 sites)
- Reduced by Google Earth Imaging and City of Arlington input for BGI suitability (13 sites)
- Reduced to parcels by BGI suitability from site visits (4 sites)



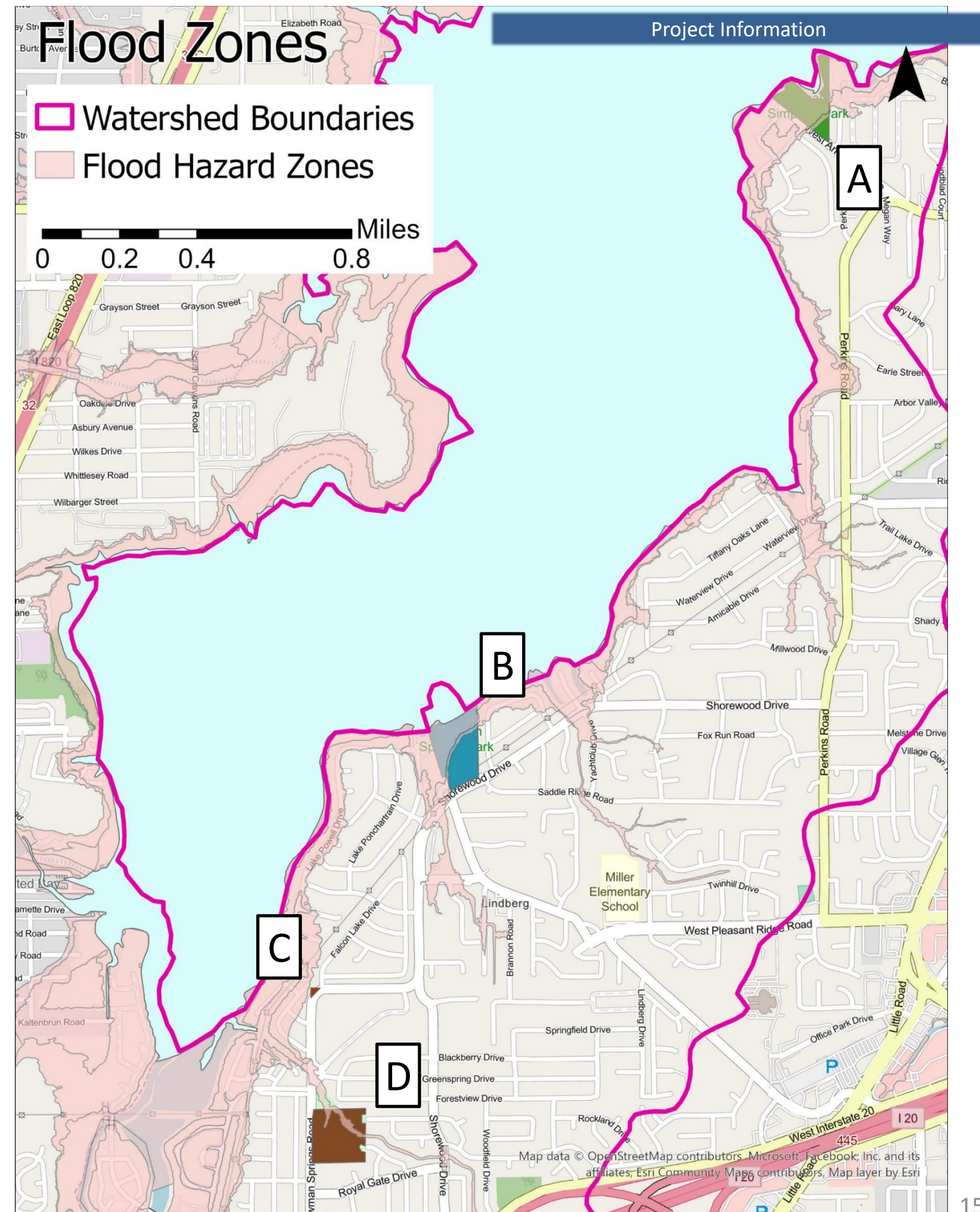
# CANDIDATE AREAS FOR BGI

- Project area and the candidate locations to implement bioretention
  - Site A
  - Site B
  - Site C
  - Site D



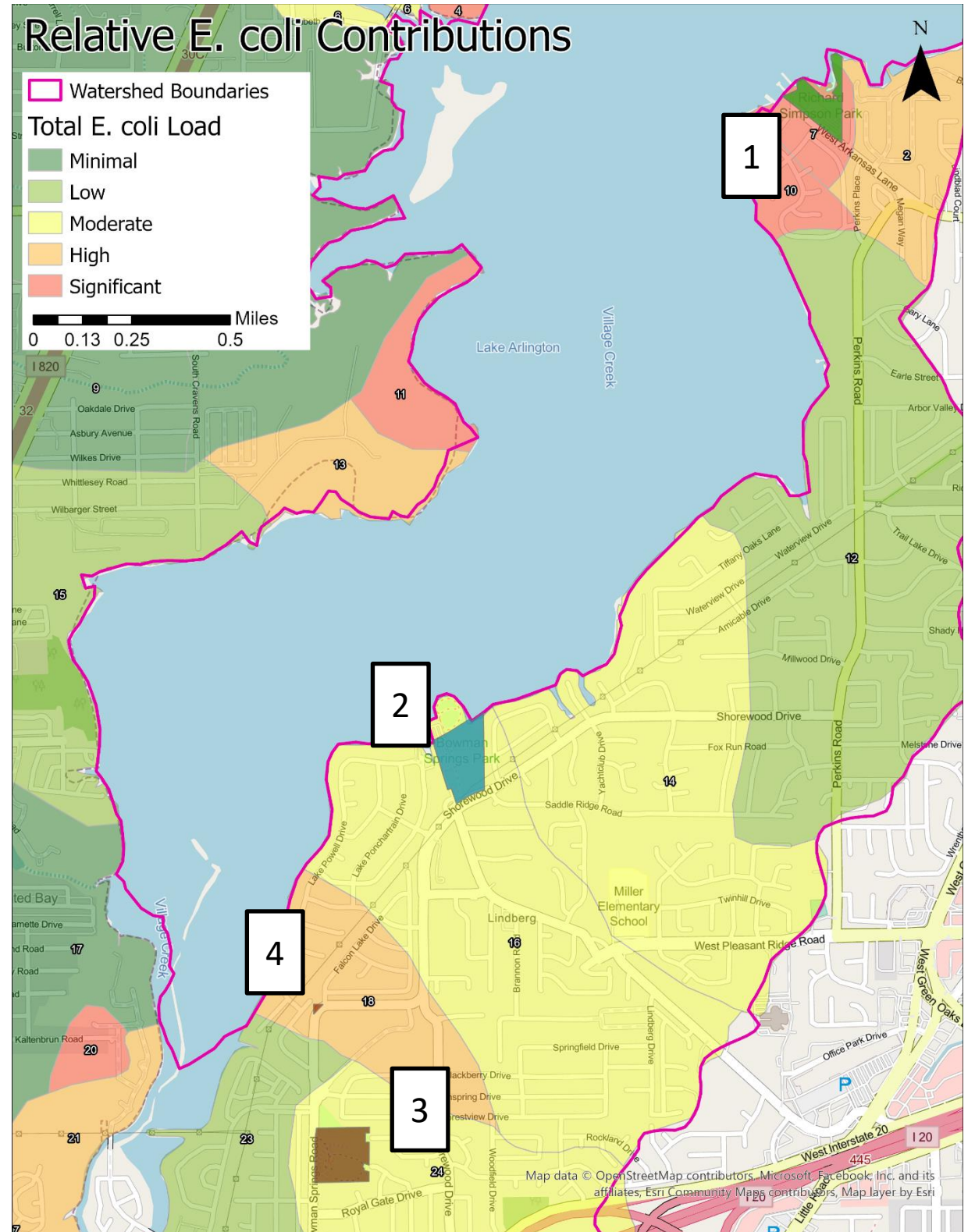
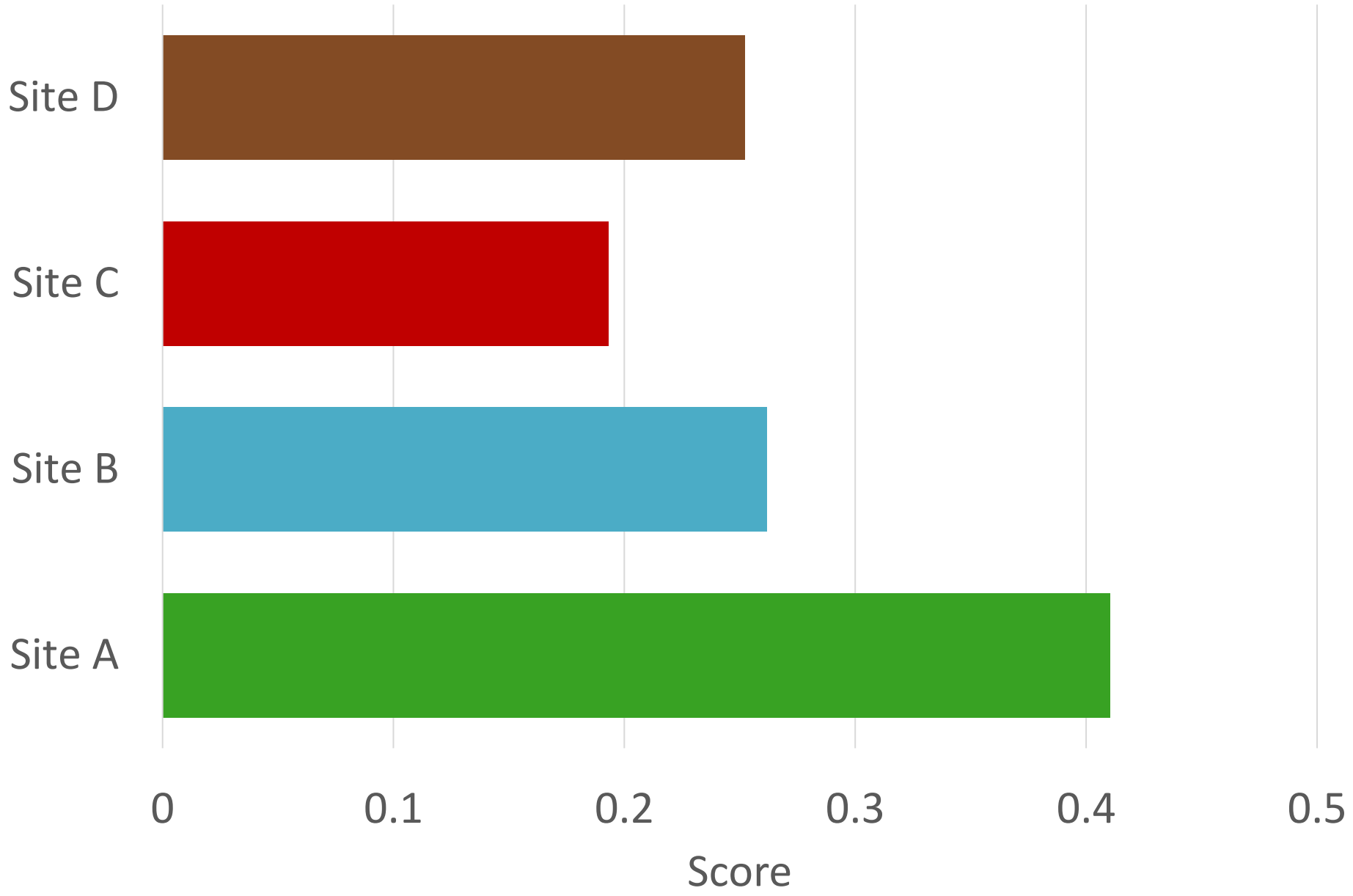
# DECISION FACTORS

- Flood zone areas
- Relative *E.coli* contributions
- Demographic Index
- Percent of population that are over 64
- Percent of population education is less than a high school degree



# SITE RANKED BY DECISION FACTORS (SURVEY 1)

Site Ranking Based on Survey 1

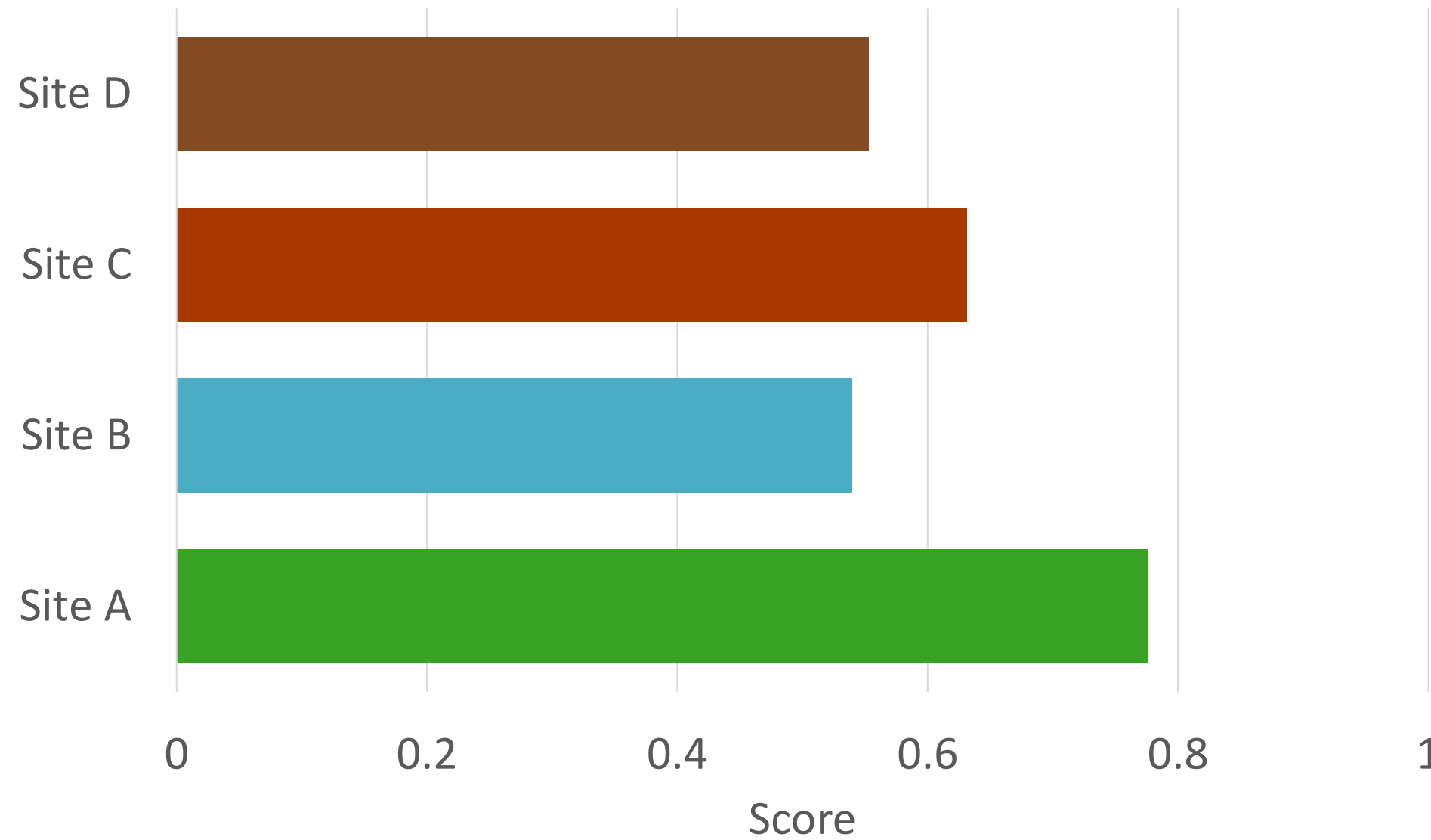


Feel free to write down the rankings next to the sites

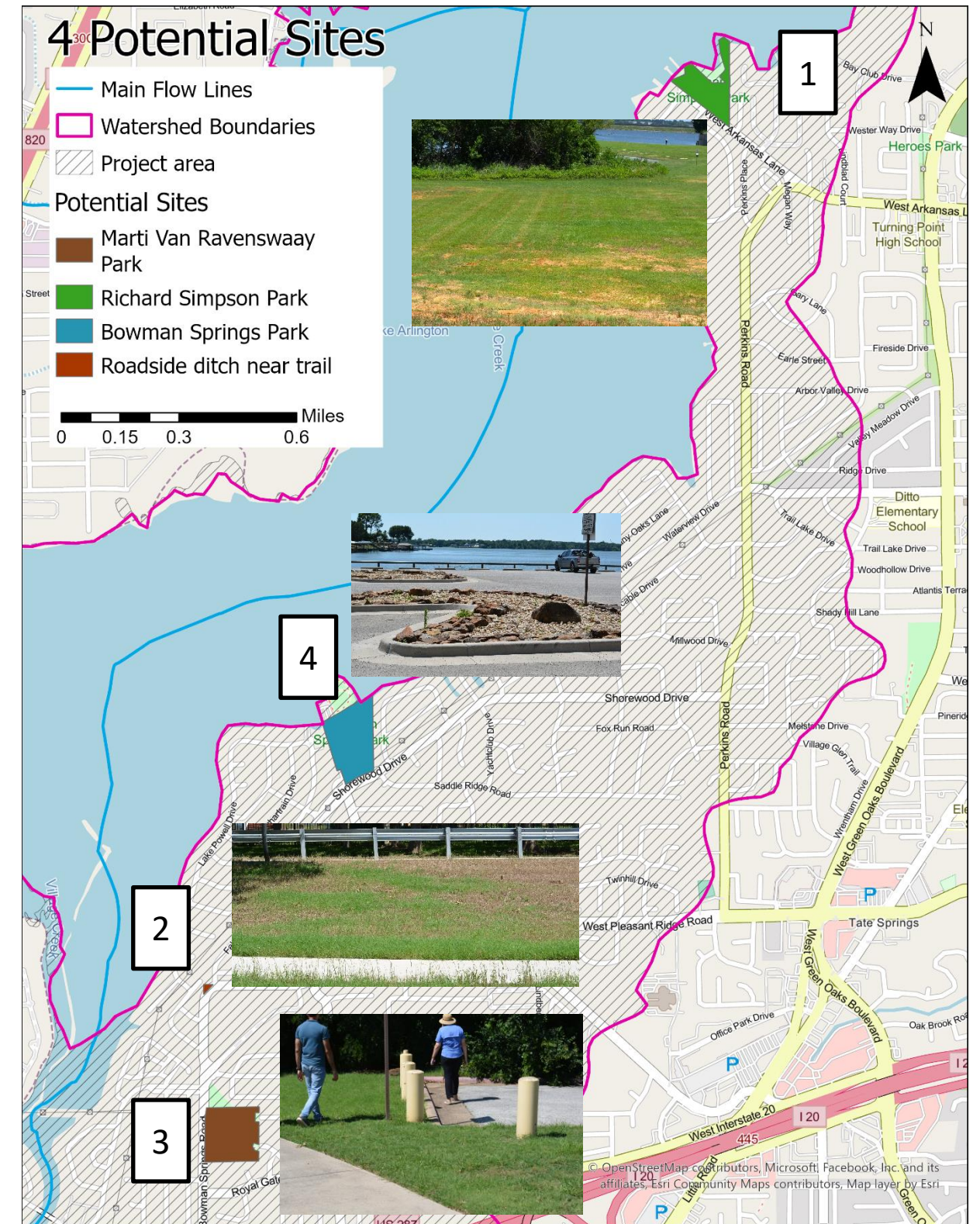
The aggregate scores/ ranks will be updated automatically with input from participants

# RANKED SITES (SURVEY 2)

Site Ranking Based on Survey 2



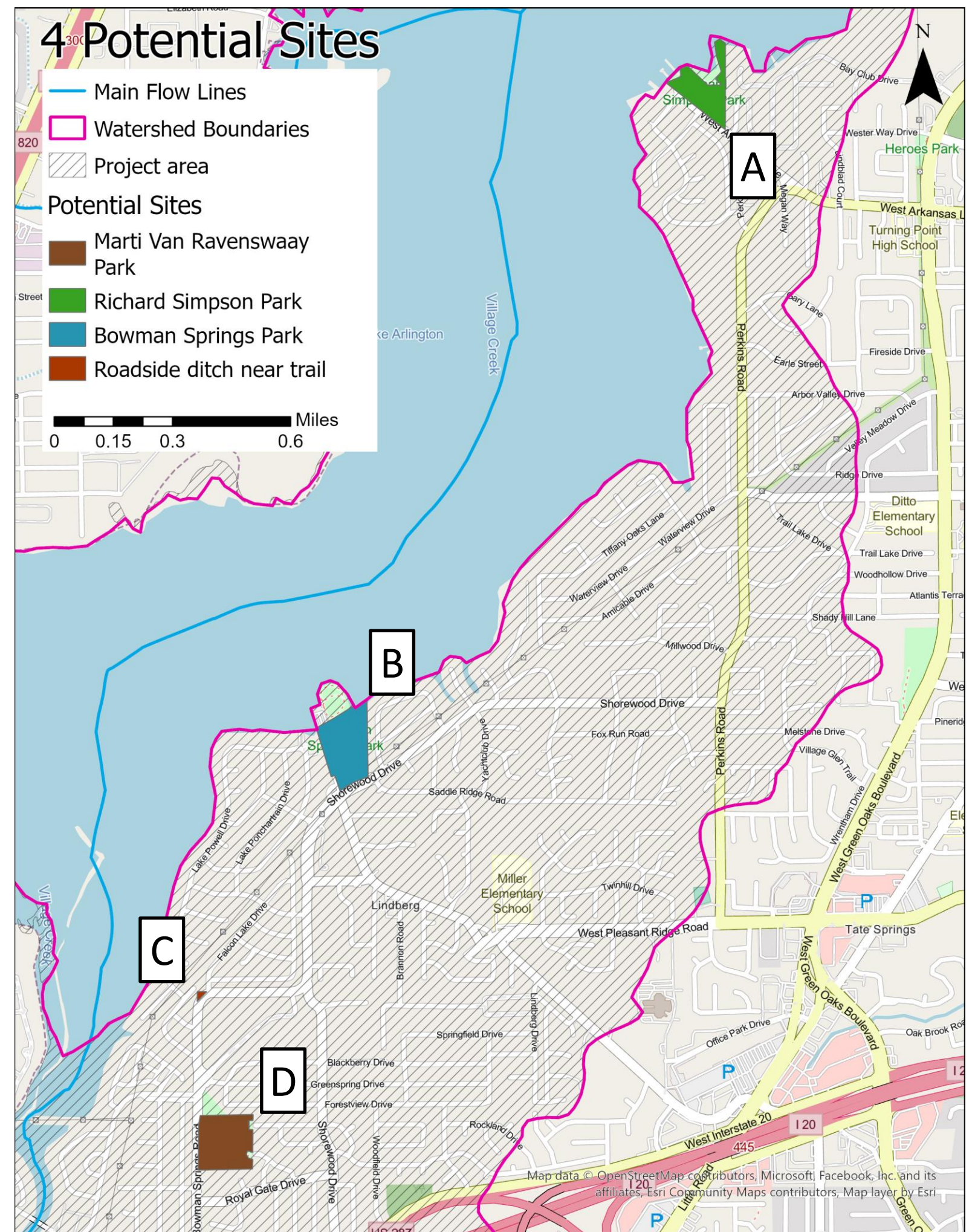
The aggregate scores/ ranks will be updated automatically with input from participants



Feel free to write down the rankings next to the sites

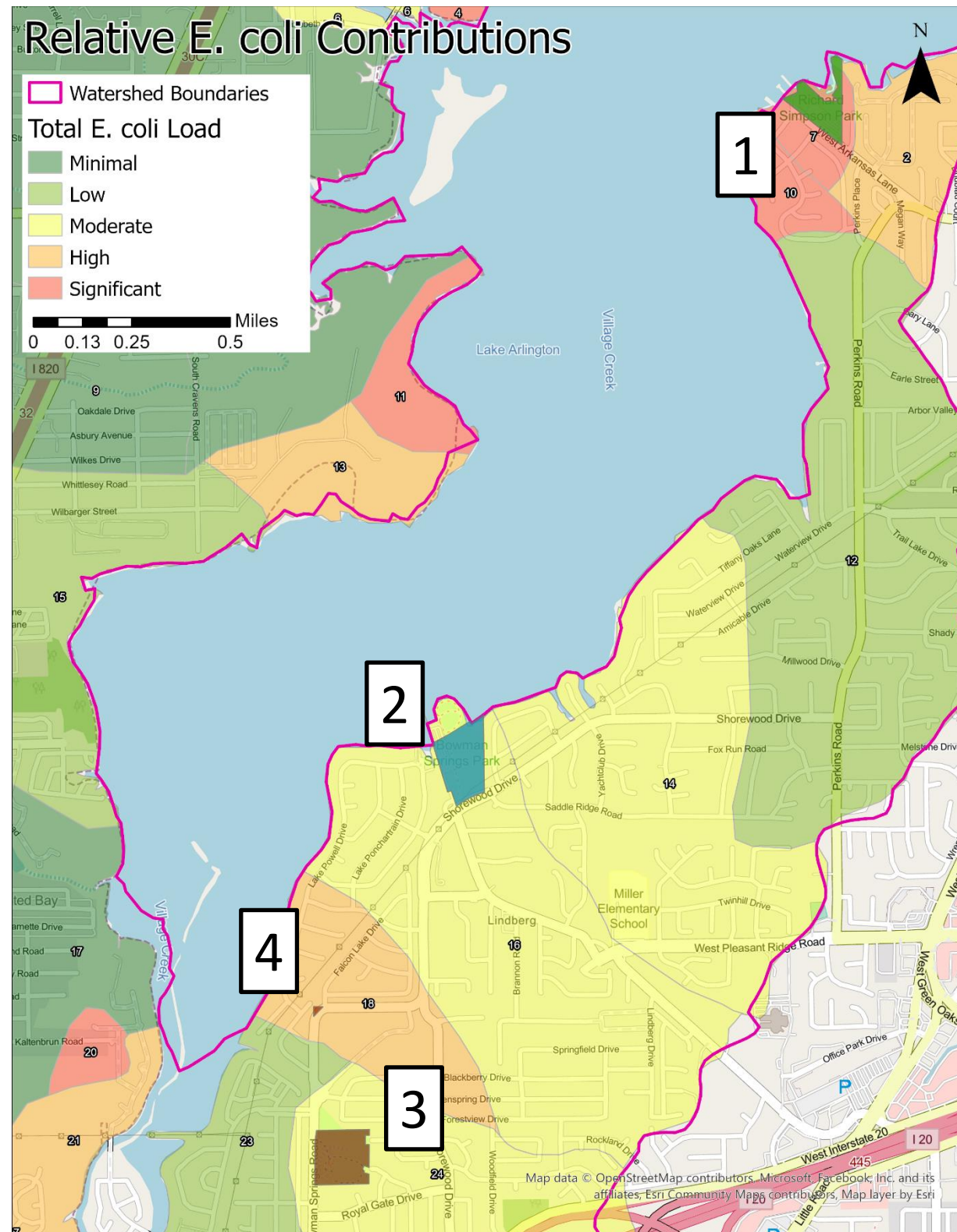
# CANDIDATE AREAS FOR BGI

- Project area and the candidate locations to implement bioretention
- Site A: Richard Simpson Park
- Site B: Bowman Springs Park
- Site C: Roadside ditch near trail @ Bowman Springs Rd/Falcon Lake Dr
- Site D: Marti Van Ravenswaay Park

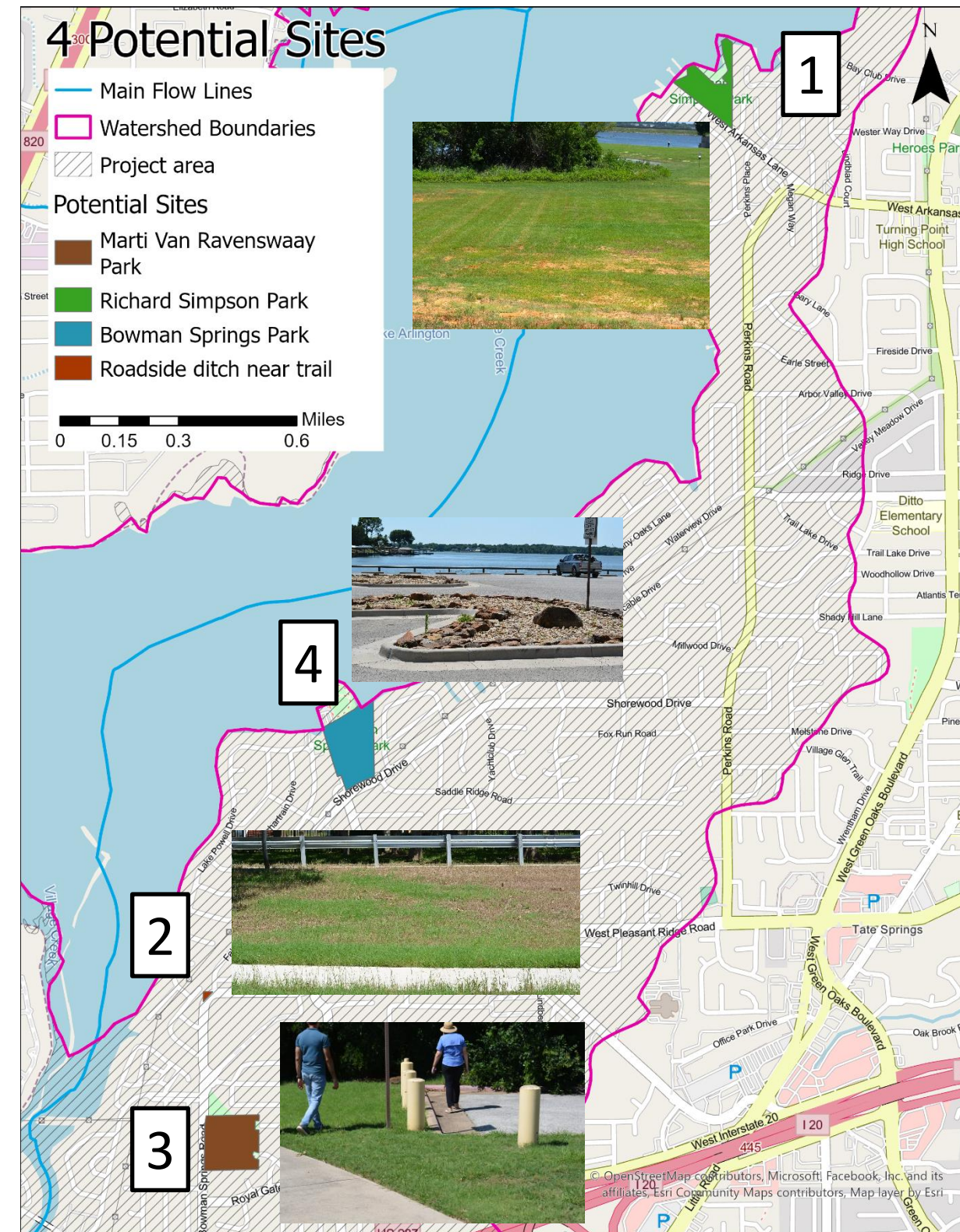


# HIGHEST RANKED MAPS AND LOCATIONS

## SURVEY 1



## SURVEY 3



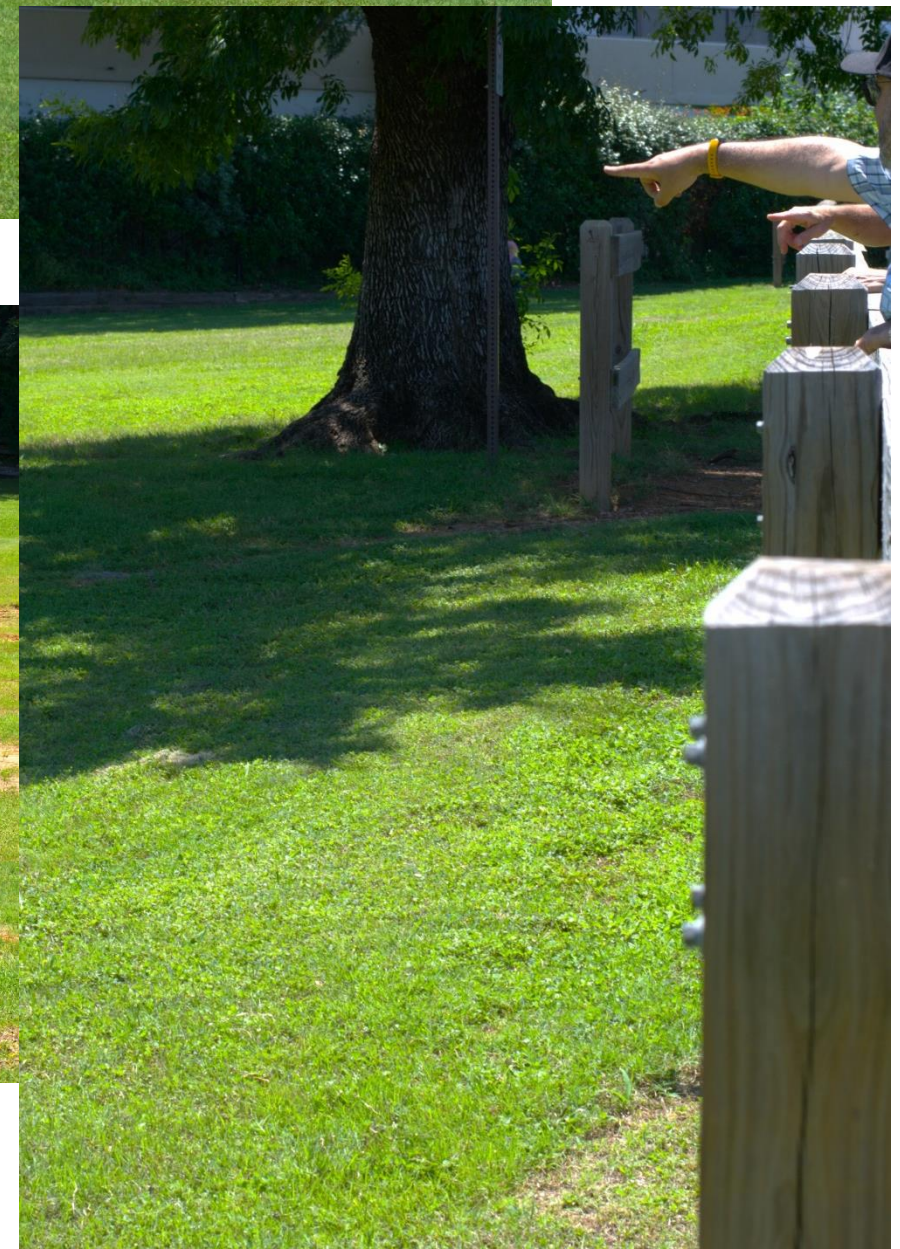
# CANDIDATE AREA FOR BGI

- Project area and the candidate locations to implement bioretention
- Site A: Richard Simpson Park

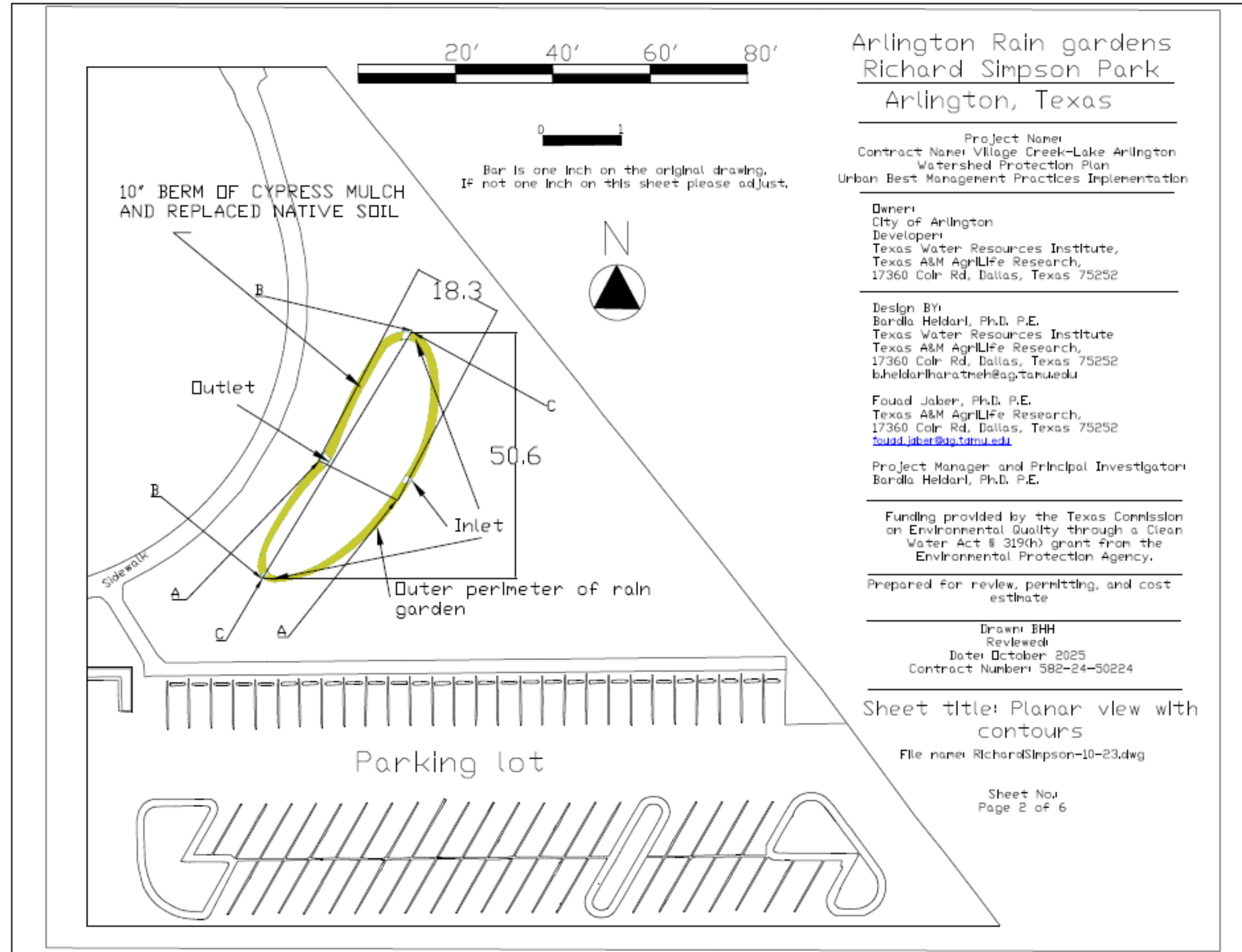


# CANDIDATE AREA FOR BGI

- Project area and the candidate locations to implement bioretention
- Site A: Richard Simpson Park



# RICHARD SIMPSON RAIN GARDEN DESIGN



# RICHARD SIMPSON RAIN GARDEN DESIGN

Arlington Rain gardens  
Richard Simpson Park  
Arlington, Texas

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Project Name:  
Contract Name: Village Creek-Lake Arlington  
Watershed Protection Plan  
Urban Best Management Practices Implementation

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Owner:  
City of Arlington  
Developer:  
Texas Water Resources Institute,  
Texas A&M AgrILife Research,  
17360 Coltr Rd, Dallas, Texas 75252

---

Funding provided by the Texas Commission  
on Environmental Quality through a Clean  
Water Act § 319(h) grant from the  
Environmental Protection Agency.

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Prepared for review, permitting, and cost  
estimate

Sheet title: Section A-A

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Project Manager and Principal Investigator:  
Bardia Helderl, Ph.D. P.E.

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Drawn: EHH  
Reviewed:  
Date: October 2025  
Contract Number: 582-24-50224

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File name: RichardSimpson\_A\_A-11-06.dwg

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Page 3 of 6

Scale In Inches: 0 20' 40' 60' 80' 100'

Bar is one inch on the original drawing.  
If not one inch on this sheet please adjust.

Local soil

Cypress Mulch & moved native soil

25% gravel size expanded shale, 10% of yard-waste compost, & 65% of washed sand

pea gravel

G-pile expanded shale

NOTE:  
REFER TO PLANTING PLAN FOR PLANTING LOCATIONS  
AND PLANT LEGEND FOR SPECIFICATIONS.  
PLANT MATERIAL LOCATION TO BE PLACED IN THE  
FIELD AND APPROVED BY LANDSCAPE ARCHITECT  
PRIOR TO PLANTING.

**Execution of soil preparation and planting for rain gardens.  
For general and product Specifications, see the Planar view  
and cross sectional sets.**

1. For planted areas of the raingarden.
  - a. Remove and discard 18" soil from the top of the entire rain garden planting area.
  - b. Replace soil with growing media in (2) 9" lifts as follows:
    - I. REF sheet Section A-A for proportions of sand-sized expanded shale, yard waste compost, and washed sand.
    - II. Thoroughly mix the soil mix with a drum mixer
    - III. Spread and roll with a lawn roller full of water for light compaction.
    - IV. Repeat for the second lift.
  - c. Plant all plants no deeper than the edge of their potted soil level.
  - d. Cover the entire raingarden with 3" of fine hardwood mulch (without dye).
  - e. Place filter fabric below the cypress mulch edge of the garden
2. Water well and hand water or run irrigation every two days for at least 2 weeks, then water at least twice a week until the first hard freeze.
3. Water once a week until the rains start in the spring.  
Water once per week next summer.

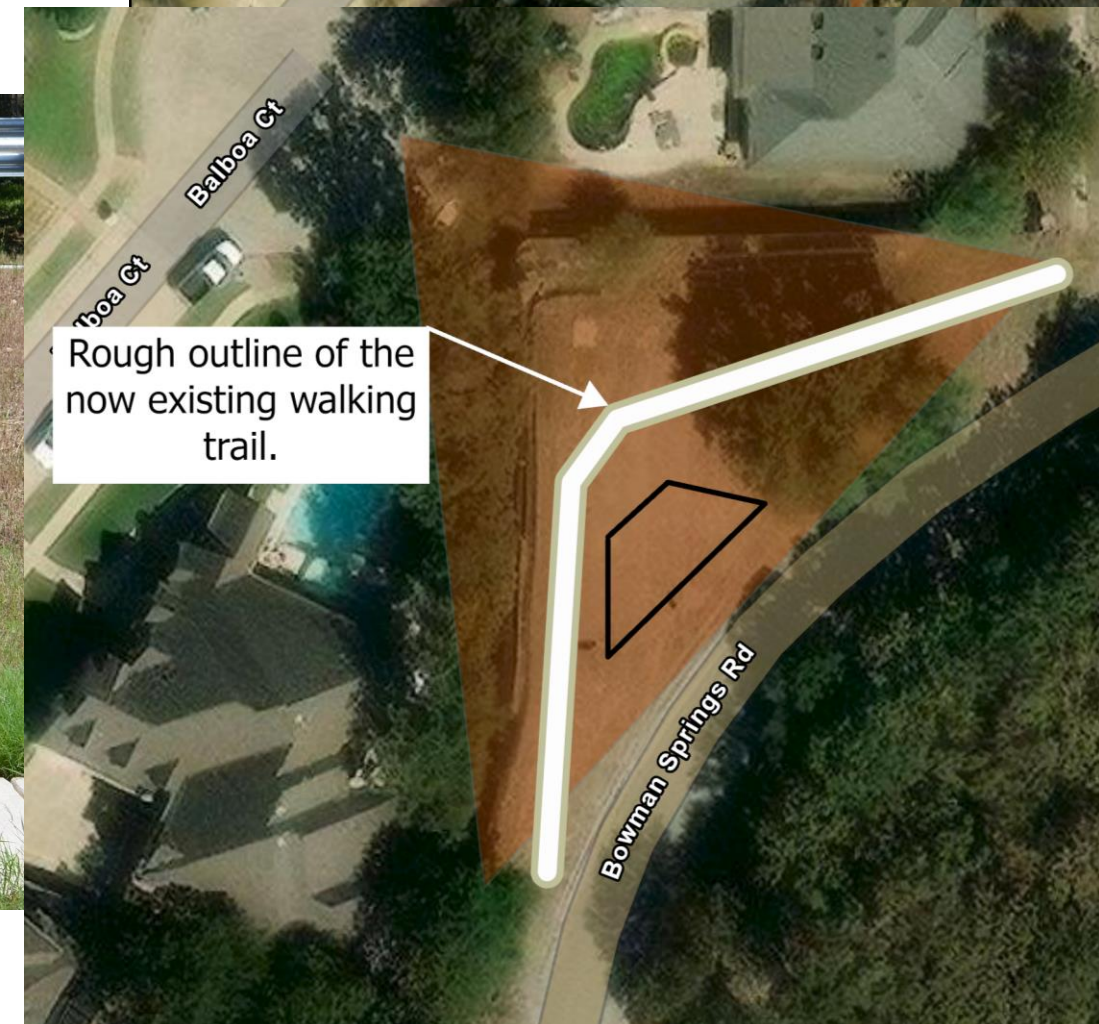
0 4' 8' 16' 24'

**A PLANTING PLAN FOR RICHARD SIMPSON PARK RAINGARDEN**

Latin Name	Common Name	Size	spacing	total #	comments	Maintenance notes
<i>Eryngium yuccifolium</i>	Rattlesnake Master	1-gal or quart	on plan	14	full and well rooted	Cut large seed stalk on March 1st.
<i>Hibiscus Leavis</i>	Halberd leaf Rosemallow	1-gal or larger	on plan	19	full and well rooted	Prune in early spring to shape
<i>Hibiscus Mocheuatus</i>	Swamp Mallow	1-gal or larger	on plan	11	full and well rooted	Prune in early spring to shape
<i>Muhlenbergia capillaris</i>	Gulf Coast Muhly	1-gal or larger	24" O.C.	97	full and well rooted	Trim, to 12" on March 1
<i>Muhlenbergia Lindheimeri</i>	Lindheimer's Muhly	1-gal or larger	on plan	3	full and well rooted	Trim, to 18" on March 1
<i>Sabal minor</i>	Dwarf Palmetto	7-gal or larger	on plan	5	at least 5 fronds	Trim winter damage once per year in mid-March

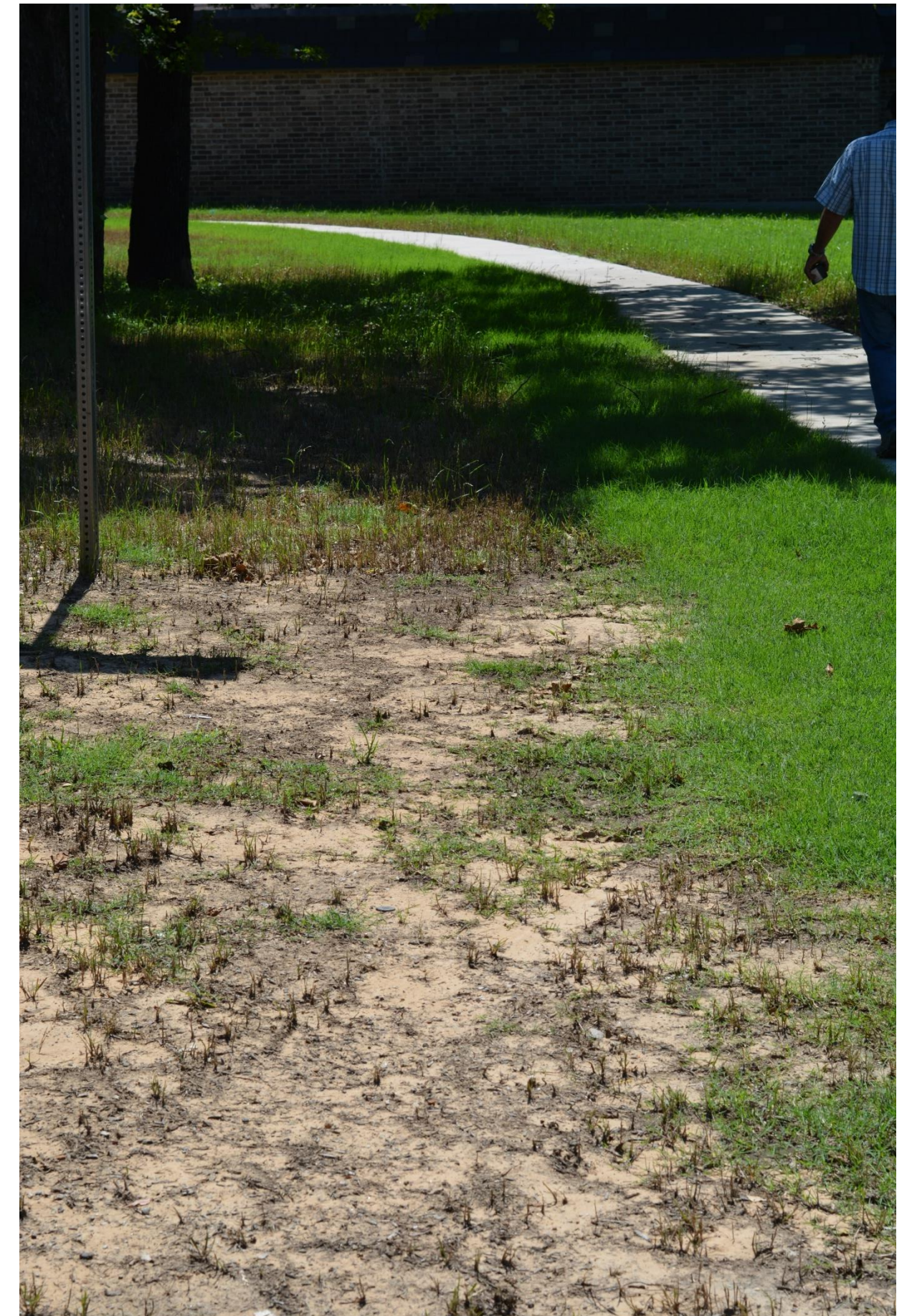
# CANDIDATE AREA FOR BGI

- Project area and the candidate locations to implement bioretention
- Site C: Roadside ditch near trail @ Bowman Springs Rd/Falcon Lake Dr

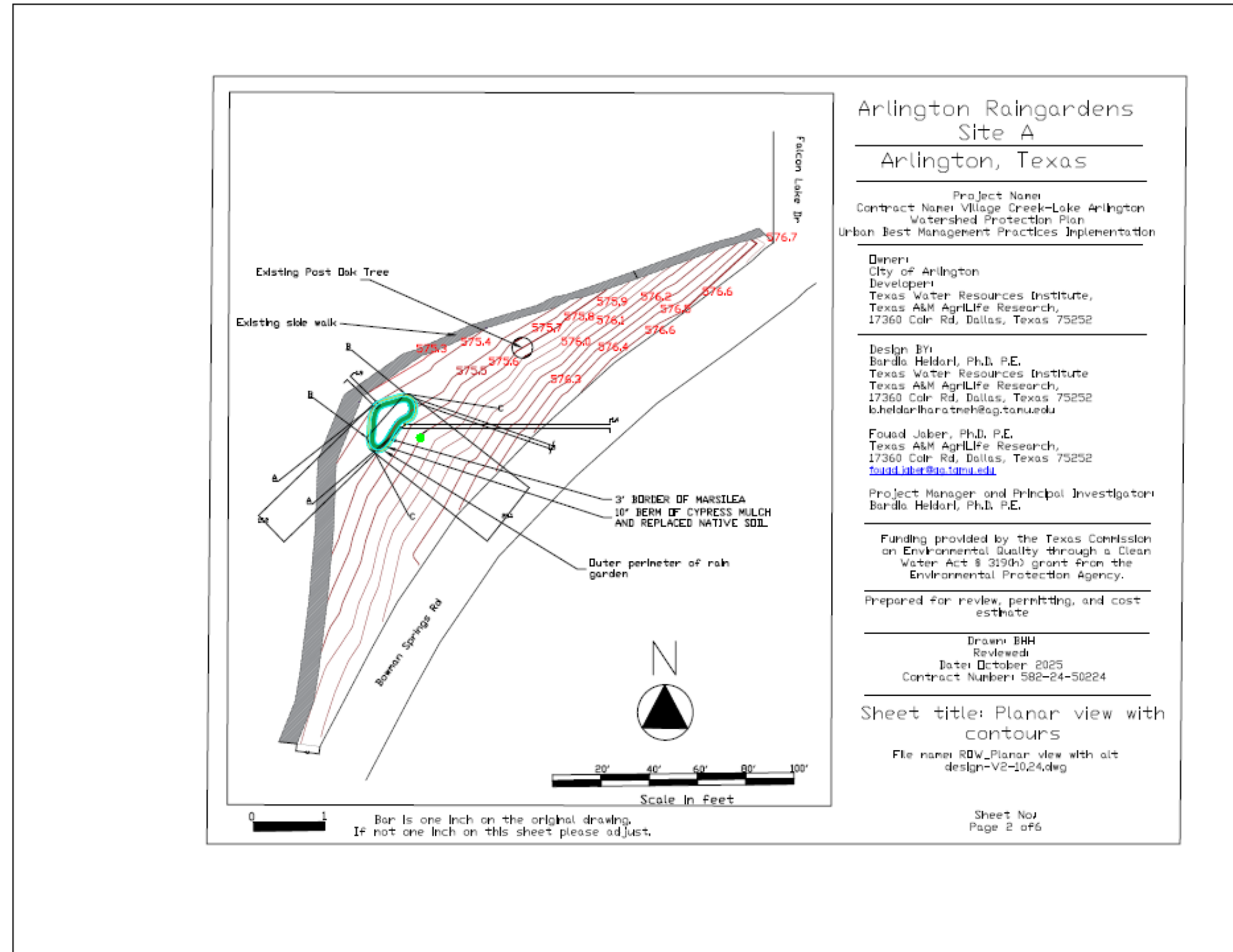


# CANDIDATE AREA FOR BGI

- Project area and the candidate locations to implement bioretention
- Site C: Roadside ditch near trail @ Bowman Springs Rd/Falcon Lake Dr



# ROW RAIN GARDEN DESIGN



## Arlington Raingardens Site A Arlington, Texas

Project Name:  
Contract Name: Village Creek-Lake Arlington  
Watershed Protection Plan  
Urban Best Management Practices Implementation

Owner:  
City of Arlington  
Developer:  
Texas Water Resources Institute,  
Texas A&M AgriLife Research,  
17360 Coltr Rd, Dallas, Texas 75252

Design By:  
Bardia Helderi, Ph.D. P.E.,  
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[fouad.jaber@agr.tamu.edu](mailto:fouad.jaber@agr.tamu.edu)

Project Manager and Principal Investigator:  
Bardia Helderi, Ph.D. P.E.

Funding provided by the Texas Commission  
on Environmental Quality through a Clean  
Water Act § 319(h) grant from the  
Environmental Protection Agency.

Prepared for review, permitting, and cost  
estimate

Drawn: BHH  
Reviewed:  
Date: October 2025  
Contract Number: 582-24-50224

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contours

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Page 2 of 6

# ROW RAIN GARDEN DESIGN

## Arlington Raigardens Site A Arlington, Texas

Project Name:  
Contract Name: Village Creek-Lake Arlington  
Watershed Protection Plan  
Urban Best Management Practices Implementation

Owner:  
City of Arlington  
Developer:  
Texas Water Resources Institute,  
Texas A&M AgrILife Research,  
17360 Colr Rd, Dallas, Texas 75252

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Sheet title: Section A-A

Design BY:  
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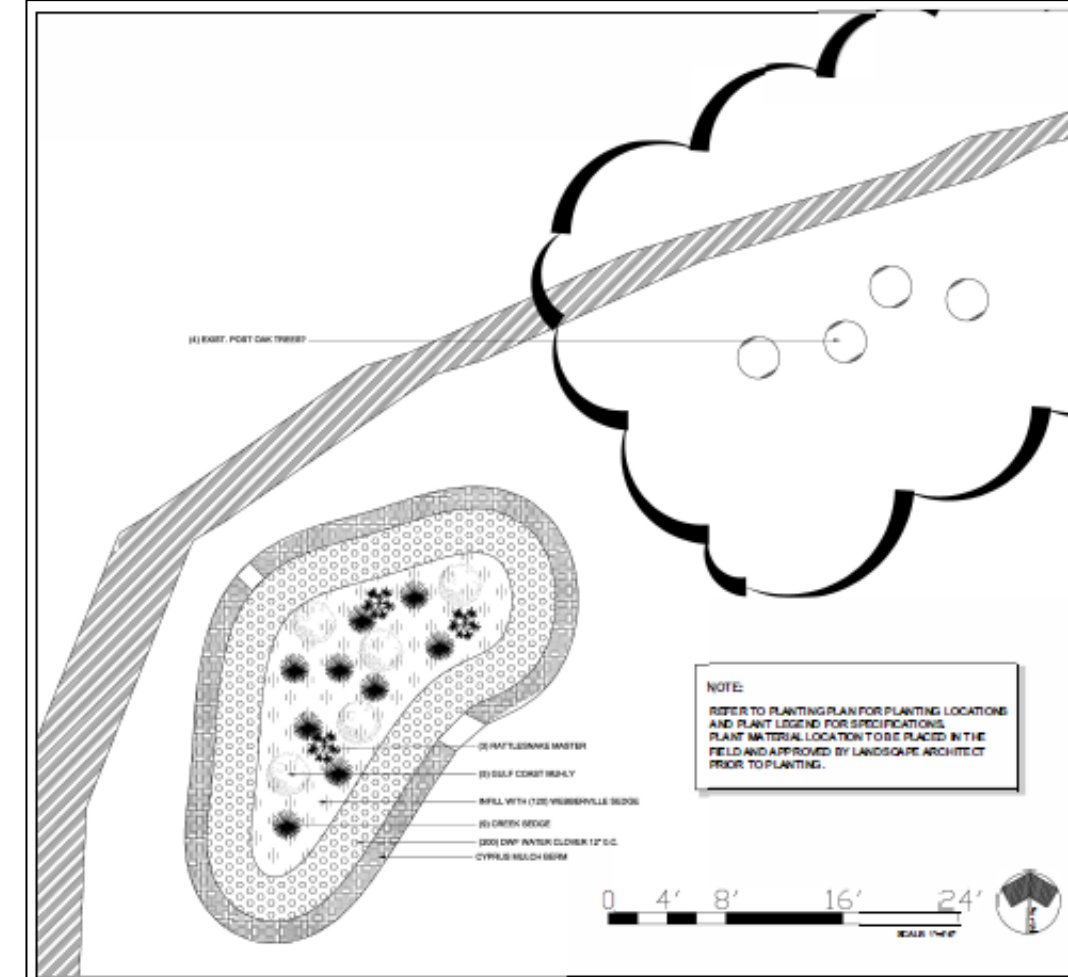
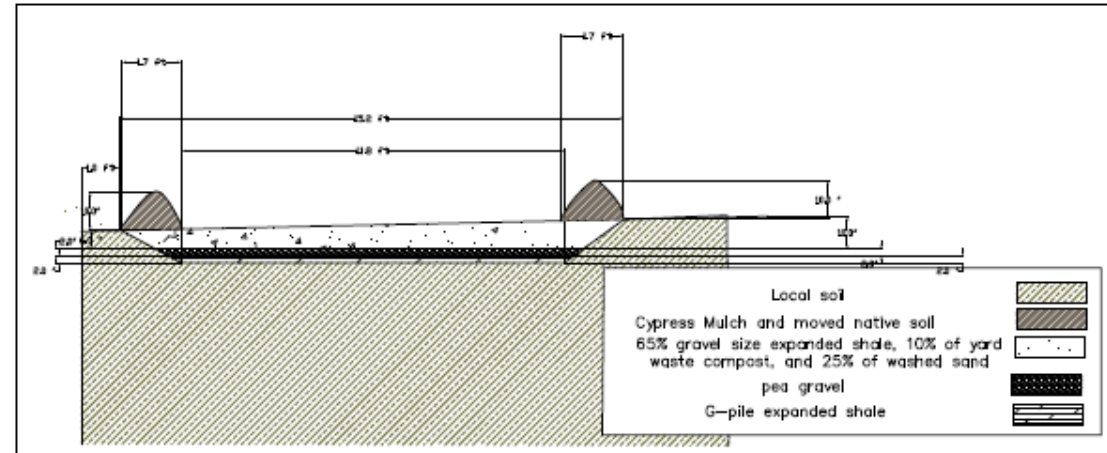
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Page 3 of 6

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20' 40' 60' 80' 100'  
Scale in Inches



PLANTING PLAN FOR SITE 'A'

Plant list for Arlington raigardens 'A'

Latin Name	Common Name	Size	spacing	total #	comments	Maintenance notes
<b>Small Raigardens (A) in Arlington</b>						
<i>Carex flacca</i>	Creek Sedge	3-gal	12" o.c.	9	full and well rooted	Trim dead leaves or seeds heads once a year if desired
<i>Carex pendula</i>	Webberville Sedge	3-gal	on plan	120	full and well rooted	Trim dead leaves or seeds heads once a year if desired
<i>Cyperus pectinatus</i>	Peltandra Mastix	1-gal or quart	on plan	3	full and well rooted	Cut large seed stalk on March 1st.
<i>Mimulus macropetalus</i>	Deer Water Clover	4" pots	12" o.c.	200	full and well rooted	mow on March 15 and once after summer to remove dormant material
<i>Muhlenbergia capillaris</i>	Gulf Coast Muhly	3-gal or larger	on plan	5	full and well rooted	Trim, to 12" on March 1

Execution of soil preparation and planting for rain gardens. For general and product Specifications, see the planar view and cross sectional sets.

- For planted areas except the Manilla border
  - Remove and discard 6" of soil from the top of the entire rain garden planting area, including the Manilla border.
  - Excavate an additional 12" for the rain garden area to a depth of 18" and keep this soil for use later.
  - Replace growing media in (2) 9" lifts as follows:
    - REF sheet Section A-A for proportions of sand-sized expanded shale, yard waste compost, and washed sand.
    - Thoroughly mix the soil mix with a drum roller.
    - Spread and roll with a lawn roller full of water for light compaction.
    - Repeat for the second lift.
  - Plant all plants no deeper than the edge of their pot soil level.
  - Cover the entire raigarden with 3" of fine hardwood mulch (without dye).
- For the planting area of Manilla only (ref LP1)
  - Replace the 6" of top soil removed with 5" of B horizon soil from the rain garden excavation (lower soil, not top soil, which is full of weed seeds).
  - Cover with 2" of compost.
  - Roll to 6".
  - Place 4 layers of newspaper over the entire Manilla area.
  - Cover with 3" of fine hardwood mulch.
  - Plant 4" Manilla pots through the newspaper to prevent weeds.
- Water well and hand water or run irrigation every two days for at least 2 weeks, then water at least twice a week until the first hard freeze.
- Water once a week until the rains start in the spring.
- Water once per week next summer.

# RAIN GARDEN DESIGN

- Catchment area estimation

$$\text{Runoff depth} = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

Where:

*P* is precipitation (inches).

$$S = \frac{1000}{CN} - 10$$

CN is the curve number.

- Runoff volume estimation

$$\text{Runoff volume (gallons)} = \text{Runoff depth (inches)} \times \text{area (ft}^2\text{)} \times 0.623$$

- Volume per square foot calculation

$$\text{Volume per square foot (gallons)} = \text{Water depth (inches)} \times 0.623$$

- Calculating the size

$$\text{Surface area of rain garden (ft}^2\text{)} = \frac{\text{Volume of runoff (gallons)}}{\text{Volume per square foot (gallons per ft}^2\text{)}}$$

**Table 1.** Curve numbers for various types of land and hydrologic groups.

Cover Type and Hydrologic Soil Group	A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.)	49	69	79	84
Paved parking lots, roofs, driveways, etc.	98	98	98	98
<i>Streets and roads:</i>				
Paved, curbs and storm drains	98	98	98	98
Paved, open ditches	83	89	92	93
Gravel	76	85	89	91
Dirt	72	82	87	89
<i>Urban areas:</i>				
Commercial and business (85% impervious)	89	92	94	95
Industrial (72% impervious)	81	88	91	93
<i>Developing urban areas: Newly graded areas (pervious areas only, no vegetation)</i>				
	77	86	91	94

(Adapted from TXDOT Hydraulic Design Manual)

**Hydrologic Soil Group Descriptions**

A: Well-drained sand and gravel, high permeability

B: Moderate to well-drained, moderately fine to moderately coarse texture, moderate permeability

C: Poor to moderately well-drained, moderately fine to fine texture, slow permeability

D: Poorly drained, clay soils with high swelling potential, permanent high water table, claypan, or shallow soils over nearly impervious layer(s)

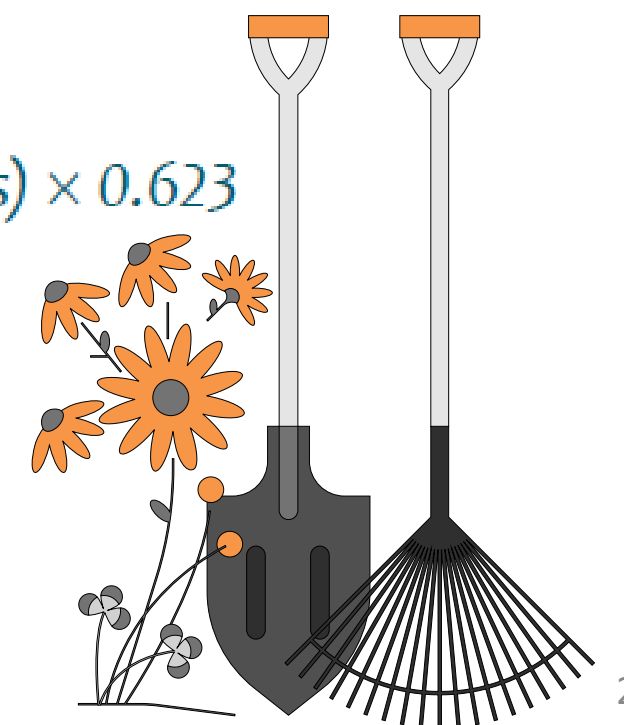


# RAIN GARDEN DESIGN

- For clay soil, use a mix of 50 percent yard waste compost, 25 percent native soil and 25 percent expanded shale (or similar material). For sandy soils, use a 50 to 75 percent native soil and 25 to 50 percent compost mix.
- Add 2 inches of mulch, preferably well-aged shredded hardwood.
- Build the rain garden to hold 6 to 9 inches of water over the top of the soil
- Assuming that the gravel and soil are 30 percent pore space, calculate the depth of water the rain garden will hold at full capacity. One and a half feet of expanded shale/clay/compost mix with a 30 percent pore space will hold 5.4 inches of water.
- Add the 6 inches of standing water on top of the raingarden soil for a total water depth of 15 inches
- Volume per square foot calculation
- Calculating the size

$$\text{Volume per square foot (gallons)} = \text{Water depth (inches)} \times 0.623$$

$$\text{Surface area of rain garden (ft}^2\text{)} = \frac{\text{Volume of runoff (gallons)}}{\text{Volume per square foot (gallons per ft}^2\text{)}}$$



# RAIN GARDEN PLANT SELECTION

- Plant palette has grown as rain garden soils have improved
- Natives are good
- Avoid invasives and ‘spreaders’



Botanical Name	Common Name	Height/Width (max)
Carex Blanda	Creek Sedge	1 ft/1 ft
Carex Perendata	Webberville Sedge	1 ft/10 ft
Eryngium yuccifolium	Rattlesnake Master	5ft/3 ft
Marsilea macropoda	Dwarf Water Clover	0.5 in./ 0.25 in.
Muhlenbergia capillaris	Gulf Coast Muhly	4 ft/4 ft
Achillea millefolium	Yarrow	1 ft/1 ft
Acorus calamus	Sweet flag	4 ft/2 ft
Alstroemeria pulchella	Peruvian	3 ft/3 ft
Aquilegia hinckleyana	Texas columbine	12 in./12 in.
Asclepias tuberosa	Butterfly weed	2 ft/2 ft
Aspidistra elatior	Cast iron plant	24 in./24 in.
Amorpha fruticosa	False indigo	5 ft to 10 ft/
Baptisia australis	Blue false indigo	3 ft/3 ft
Calyptocarpus vialis	Horseherb	4 in./18 in.
Canna generalis	Canna	2 ft to 6 ft
Coreopsis verticillata ‘Moonbeam’	Moonbeam coreopsis	18 in./18 in.
Dichondra argentea ‘Silver Falls’	Silver falls	2 in./4 in.

# RAIN GARDEN DESIGN MAINTENANCE

Rain garden is Low Maintenance...



...but not *NO* maintenance

# RAIN GARDEN MAINTENANCE

- Visit site within 24 hours of 1 inch rain event (avg 11-12 /yr)
- If water is still ponded site has clogged
- Action needed
- Do this once or twice per year



# CURB CUT



# PLANT DENSITY



Keep it open!

# RIP RAP



# CLOGGED OUTLET



# EXAMPLE RAIN GARDEN MAINTENANCE TASK SCHEDULE

Task	Frequency	Maintenance Notes
PRUNING	1 – 2 times/yr	Nutrients in runoff often cause bioretention vegetation to flourish
MOWING	2 – 12 times/yr	Frequency depends upon location and desired aesthetic appeal
MULCH REMOVAL	Once every 2 – 3yrs	Mulch accumulation reduces available water storage volume. Removal of mulch also increases infil. rate
WATERING	Once every 2 -3 days for first few months. Seldom after establishment	During droughts, watering after initial year may be needed
FERTILIZATION	Once initially	
REMOVE AND REPLACE DEAD PLANTS	Once per year	>10% of plants may die, survival rates increase over time
MISCELLANEOUS	Monthly	Trash collection, spot weeding, removing mulch from overflow

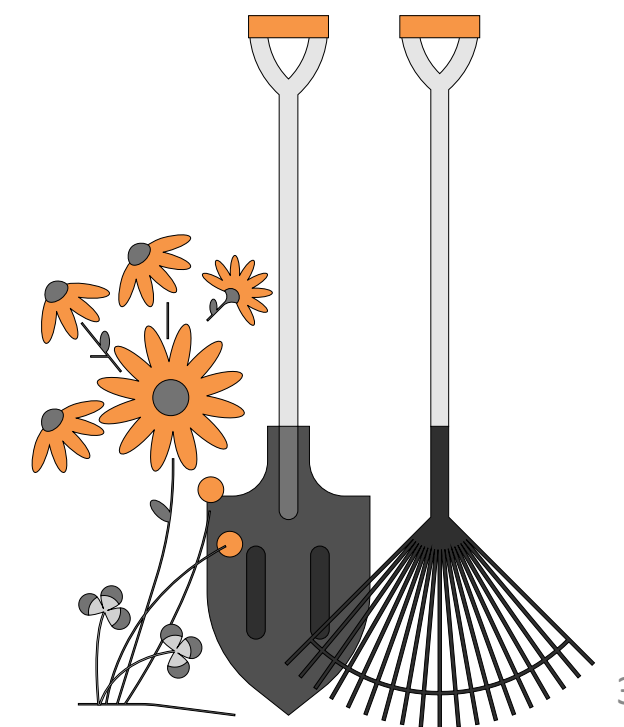
# LESSONS LEARNED

## Collaboration

- Reach out to potential collaborators from the beginning and keep communicating
- Issues will be discovered so keep an open mind for revision and pivots
- Utilize your network

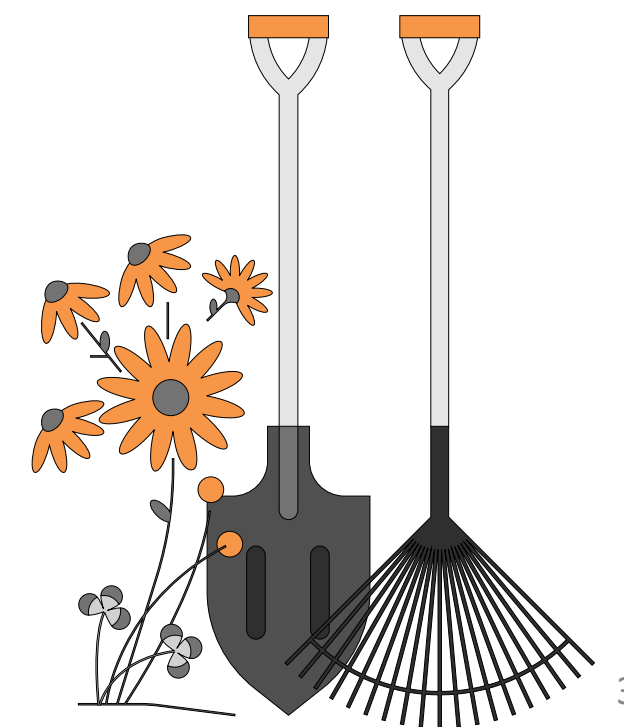
## Design

- It is fine to overdesign and adjust as needed
- Plants need care even before planting
- Plan for redundancy and setbacks



# NEXT STEPS

- Educational sign installation and publishing the webpage
- Monitoring
- Second outreach event for the public
- Maintenance MOU





Let's go and see our new  
rain garden!

# RainGarden Tour

# Schedule for Next Meeting:

August 2026

9:30 AM

Location TBD

Ideas for next meeting's presentations?

## Contact

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